

The image shows the interior of a converted industrial building. A large, multi-paned glass facade allows natural light to fill the space. A prominent dark metal beam with the number '121' is visible. Below, a pub named 'Fantasy' is the central focus, featuring a red and white striped awning and a sign that reads 'EAT HERE • TAKE OUT' and 'HOME OF THE ORIGINAL'. The pub's interior is visible through the glass, showing patrons seated at tables. In the foreground, there are several tables with yellow chairs. A large green tree is positioned near the pub entrance. The overall atmosphere is a blend of industrial heritage and modern dining.

# Reusing the Industrial Past by the Tammerkoski Rapids

*Discussions on the Value of Industrial Heritage*

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## Fore Word

*Dear reader,*

**T**his publication aims to inspire discussion on the evaluation of industrial heritage and the criteria for good reuse practices. The City of Tampere is particularly interested in the future protection and maintenance of industrial heritage in the Tammerkoski area. The national heritage landscape of Tammerkoski is listed frequently as a unique and even internationally rare instance of industrial built heritage. Because it is located in the very heart of the city, however, it has been quite susceptible to change. The question of good reuse practices is thus of utmost importance in the evaluation of the industrial heritage of Tammerkoski.

The present volume contains many essays that approach the issue of evaluation from interesting perspectives. They allow the reader to see how historical values can develop, how the spirit and identity of a site can be retained in the midst of change, and also what might be recipes for successful reuse. The issue of quality therefore merits discussion, but also research is needed to bring to light previously unrecognised values. One example

of such values might be culturally and historically valuable maintenance technology: mechanical and electrical installations. Other interesting issues concern the various reuse potentials of archaeological industrial heritage, and how the public should be told about subterranean monuments. When an area of industrial heritage is extensive and located in the centre of the city, it is important to consider also how much of the spaces and functions should be appropriated for public use. Should perhaps some spaces be left unplanned so as to allow them to be appropriated by future generations in their turn, to ascribe their own meanings to these sites?

Such viewpoints are very important for the future of the industrial heritage at Tammerkoski. We hope that this publication will be useful for all who engage with the local, national and international values of industrial heritage in similar situations.

*I wish you pleasant reading with industrial heritage!*

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# Introduction

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**I**n the beginning they were ruins, Remains of a Revolution (as they were styled in the title of a famous travelling exhibition organized by the British Council which contributed a great deal to the popularization of industrial archaeology throughout Europe in the late '70s in the last century), or entire structures, buildings, canals, railways which, having lost their original functions, lay in the former industrial areas, forming a new landscape, albeit not always a reassuring one. These were sometimes called derelict lands, and actually they were derelict primarily in cultural terms, one might say in terms of cultural legitimacy, and then, consequently, also in practical terms. No longer useful, no longer interesting, no longer attractive (if they had ever been considered aesthetically attractive during their glorious productive past).

There is an echo of such a situation also in some passages of the essay written for this book by Marja Lähteenmäki, which very accurately depicts the emergence of public consciousness of the relevance of former industrial buildings, putting it in the context of the public debate about Tampere town planning in the '70s of the 20<sup>th</sup> century. Comparing it with the situation in other European countries in the same period, we can see some similarities, but also some differences. In short, one could say that this was a period of growing awareness about industrial heritage



all over Europe, yet at the same time a sentence such as “By the 1970s Tampere had already taken to reuse factories” is not applicable to many other European towns. Also the fact that the National Board of Antiquities presented the protection of seven industrial buildings as early as 1974 is in a certain way pioneering. Certainly this was not the case in most Mediterranean countries, for

instance, although the first examples of a positive attitude towards the fate of historic industrial monuments appeared in more or less the same period in many different national contexts.

But it is one thing to face the practical problem of the destiny of a decommissioned industrial building, and to be involved in the complex negotiations implied by town planning with its consequences on the survival (or not) of the physical remains of our industrial history, quite another the cultural process which determines a coherent preservation policy at different levels and with a comprehensive view, not limited to the “opportunities” offered by specific circumstances. The first two essays of this book (Haapala and Järvi) are extremely helpful in this sense as they clarify the necessary historical background of the Tampere case as well as the size and quality of the “stock” of industrial monuments passed down to the present generations.

I have deliberately introduced here the term “industrial monument” because it is the key element

throughout this problematic area. It has to be said that initially the term was not easily accepted by the scientific and academic circles, just as was the case with the expression “industrial archaeology”. At first glance, both seemed to be intimately contradictory: to give an idea, I can tell you that when in 1977 I proposed an Italian academic publisher to publish a book with the title “Industrial archaeology”, the person in charge of the decision replied “Oh, I see, archaeology done on an industrial scale, no more digging by hand, but using caterpillars instead, etc...” He was kidding... but perhaps not entirely; maybe he was simply puzzled by the combination of the word ‘industrial’ (synonymous with modernity) with the word ‘archaeology’ (synonymous with antiquities, especially in Italy). Incidentally, the book was published in the end, and was the first one in Italy on this subject.

The same semantic friction could be perceived when speaking about monuments of an industrial nature. This did not necessarily mean monuments produced in an industrial way (although that was the case in many situations), but industrial structures or ruins with a monumental status. Monumental in all senses of the word: because of its contents and meaning in terms of memory (the Latin root of ‘monument’ implies the idea of something worth remembering); in terms of size and “congruity” which makes of an industrial site a landmark; because of its historic relevance or uniqueness; and – last but not least – because of its aesthetic values (if any), including its atmosphere, an intangible quality which can elicit a very special perception on the part of the visitor, even if the monument is in ruins, a condition not always easy to decode (perhaps this has something to do with the idea of “sublime” evoked in Štelbienė’s essay in this book).

The methodological apparatus which has defined the limits and tools of industrial archaeology came later, and the specificity of “this” kind of archaeological work is well exemplified by the text of U. Läh-

desmäki and V. Adel on the case of the Frenckell paper factory area in Tampere. Fieldwork has from the very beginning been the distinctive feature of industrial archaeology, partially motivated by the fact that people interested in the subject went outdoors, into the field, to detect signs and remains of the industrial past, to save things from oblivion or to gather the knowledge which could form the basis of preservation programmes. The traditional approach to industrial history – as being based on written documents – was extended to cover the whole spectrum of possible elements which formed the industrial society, including oral history which is frequently very important in order to interpret productive processes or the use of specific tools, and the monuments themselves, of which little written documentation was often available for historic studies.

Today, this strong emphasis on the tangible aspects of industrial heritage is in some sense counterbalanced by the importance of intangible elements, which is due also to the tumultuous development of the “digital factor”, and it is likely that we will see the growth of a sector of industrial archaeology which will deal specifically with intangible elements. This is a difficult question which is especially evident in museums dealing with the history of computers, for the preservation of machineries is comparatively easy, but the preservation of the intangible driving force (the software packages) puts on the table problems never dealt with before.

In order to put it simply, one can stress that the notion of industrial monument has been growing and assuming a precise profile just as long as the concept of industrial archaeology has been developing. At the beginning, this happened in the context of a cultural movement, later on as a discipline or, as some prefer (and personally I am inclined to agree with this opinion), a field of research involving different disciplinary approaches and methods which find their area of application within the perimeter of industrial heritage. It is interesting to note that

*in most European countries the idea of industrial archaeology emerged from an amateur and popular interest in the physical remains of some local industrial episode, in the traces of a past frequently neglected or even denied as being linked to unpleasant memories of exploitation, social conflict, or rapid changes in ways of life that are rarely accepted with enthusiasm by communities, and so on.*

*In a short essay, written as an introduction to the catalogue of a touring art exhibition, *The Romantic Factory*, organized in the early 1990s in Italy, Kenneth Hudson defined the cultural climate in which industrial archaeology started: the late '50s and early '60s in Great Britain, the cradle of the first Industrial Revolution. He put together different elements, including the sense of a loss of identity connected with the beginning of industrial decline (or at least of the factory system known till that moment), the end of the British Empire, a certain sense of nostalgia for a working-class culture which was perceived to be in danger of becoming obsolete as a consequence of the "long tide" of the social changes caused by the Second World War in industrial societies (which, it must be noted, were not yet post-industrial at that time). But it is only when these elements – which can of course be different depending on the individual national and local historical contexts – are pollinated by a turn in the public aesthetic perception of industrial tangible memories that the process starts of the legitimacy of industrial heritage, and consequently the growth of that set of rules for its analysis, evaluation, interpretation and possible revitalization which goes under the name of industrial archaeology. And as a consequence, what was until that very moment simply an object or a building which had lost its original function (whether textile machinery or a cotton mill), became a "monument", something worth to be remembered, to be appreciated, preserved and possibly loved.*

*One could identify the inclusion of historic industrial sites on the UNESCO World Heritage List*

*as a symbolic point of culmination of the evolution, starting in the early stages of industrial archaeology, of a movement of enthusiasts into a discipline and an atmosphere of public opinion capable of influencing relevant decisions on the reuse of declining industrial areas, as well as the advent of new kinds of cultural institutions, particularly in the museum field, where the birth of new museological ideas (such as the idea of ecomuseum, first formulated in Le Creusot, where the role of industrial remains was essential) is frequently linked with solutions offered for the reuse of industrial heritage. The problem of creating a museum, or, if you prefer, a museographical framework, around such a large item as the first iron bridge to be built in human history (1777), has spawned a very special kind of museum, the first of its breed, the Ironbridge in Shropshire – just to offer an example of a pioneering experience based on a great industrial monument.*

*In this context, Tampere is headed in the direction which finds its antecedents in the renewal of Manchester after the very serious industrial collapse of the '60s and '70s: a varied industrial townscape, the crucial role of a dense urban "texture" of industrial buildings in the heart of the town, wide stratification also in terms of styles and formal solutions, the relevant size of the areas involved in the rehabilitation programme, only to quote some of the most important aspects.*

*This goes also well together with the fact that Tampere was called the Manchester of Finland. It is interesting to note that practically speaking every European country (and the USA, too) in the 19th century had its "Manchester", i.e. a town which claimed to be the nest of the national Industrial Revolution and a typical example of a large industrial town where every aspect of social life and of the local landscape was determined by industry, by the factory system, and especially by the textile industry. My country, Italy, counted at least three which defined themselves the "Manchester of Italy", each*

one in competition with the others: Prato (near Florence), Biella (in Piedmont) and Schio (in the Veneto region). All of them had good reasons for claiming to be a sort of Manchester, being places of ancient industrialization specifically in the field of wool, and also seats of innovation both in terms of technology and of the way of organizing productive and social life, frequently importing models from abroad. But none of them had the scale and the world leadership of the original model. And when Charles Dickens visited the United States, he found his American version of Manchester in the factory town of Lowell (Mass.), which one hundred years later would become a pioneering example of historic preservation in the field of industrial archaeology, a large-scale programme still worth study.

Tampere was not one of the world capitals of the Industrial Revolution, either, and its urban structure is certainly less extended and articulated than the Manchester *forma urbis* (just think about the role of the canal network in the British case and the central position of the Tammerkoski Rapids in the Finnish one), yet the metaphor of the Manchester of Finland is useful for understanding its symbolic position in the historic Gotha of industrial Scandinavia. Another aspects which makes the industrial heritage in Tampere simultaneously local and global is the role played there by foreign entrepreneurs, again a factor common to most of the “Manchesters” that flourished throughout Europe in the second part of the 19<sup>th</sup> century. In most cases, the kick-off was either given by foreign entrepreneurs or by many of the technological devices as well as some of the architectural features of industrial buildings that were more or less explicitly imported from abroad. As regards the establishment of a European industrial culture in Tampere, the role of James Finlayson extended far beyond his specific personal adventure, which did not last very long. There were also Baltic Germans later who imported machineries from Belgium and Germany (as happened in many similar cases in

Italy, France, Poland, etc.), and of course there was the special relationship with Russia... all elements we can find in the other “continental” Manchesters when they become crossroads for an interchange of industrial cultures and know-how.

This can also be read in the architectural profile of buildings with their use of red brick, some neo-Gothic revival decorations as well as other elements which are all part of a sort of “industrial style” that presents many similarities all over the world. This is a worldwide exchange of elements and suggestions, so that you find factories built “the Manchester way” in the South of Europe, or wooden cottages very similar to the ones in late-19<sup>th</sup> century Russia and Finland in the miners’ villages of Upper Michigan Peninsula, for example (there were important Finnish workers’ communities there). It is a melting pot where one can see the becoming of modern industrial culture. This culture is now well presented in contemporary Tampere in its museums that are one of the major aspects of the process of rehabilitation which has occurred in the last decades. The outstanding reuse of important buildings to host cultural institutions and museums in particular, where stories about the industrial past in all its multifaceted aspects are told in a modern and very effective way, this is a key factor in the definition of the contemporary identity of Tampere. It is a strategic choice by local public authorities, a choice which continues to give fruit with the creation of an innovative museum environment intimately connected with the outdoor historic industrial environment which characterizes this part of the city centre along the river.

In this sense, Vapriikki is a museum centre of great meaning and importance, it gives a clear key for the interpretation of the spirit of Tampere to the users of its facilities (residents or visitors). It is a powerful tool for “cultivating a feeling for the industrial past” as Kenneth Hudson titled one of his last lectures, with the final fascinating aim “To get inside the hearts and minds of our ancestors...”.

# Tampere: A History of Industrial Society

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## The Big Picture

Men have goals, but history has not. The meaning of Tampere can be found only in the aspirations, hopes and work of the local people. They built the city, but not alone. Each locality has a wider history, too, i.e. interactions and dependencies with the rest of the world. In the case of Tampere the most rewarding historical context is not the making of Finland but the making of industrial society. That has been the unique identity of Tampere and its people for the past 200 years. The rise of industrial society is also the key to the history of the city and to its *raison d'être*.

Thus, the content of the history of Tampere is the rise of industrial society, or industrialisation, which in fact has not ended. Industrialisation has been a global process, and Tampere has been a part of that. Hundreds and thousands of similar industrial communities emerged in the 19<sup>th</sup> century. All these localities were unique, of course, yet they resembled each other very much. This makes us believe that there exists a shared historical experience of the industrial world, which can be found in localities such as Tampere in the form of everyday experiences and historical memory.

An even broader perspective on the same process is modernisation, the making of modern society, which has changed the world radi-



cally over the past 200 years. Industrialisation and modernisation divided the world into two parts in the 19<sup>th</sup> century: one part enjoyed economic growth and rising standards of living, the other lagged behind. In this puzzle of global economy, Tampere and Finland happened to become part of the “developing world” of the time. And not only in economic terms: as historians noted at the time, a new kind of man of modern thinking was emerging. In the first history of Tampere, written by Väinö Voionmaa in 1907, the author’s perspective was that the birth of industrial capitalism and the labour movement were “fruits of the 19<sup>th</sup> century economic progress, democracy and education”. Though critical to the inequality he saw around, his idea of

combining economic growth and civilisation offered a fresh and clear view compared to later historiography which has emphasised the social ills of industrialisation.

### **A Brave Beginning**

The city of Tampere (or Tammerfors, as its name was in Swedish at the time) was founded in 1779 by Gustavus III, the King of Sweden. This was about the same time as the birth of the USA, and a decade before the French Revolution. These two big events are often regarded to represent the two great shifts in the history of Western societies: the emergence of capitalism and democracy. Accident or not, these events had an immediate impact on the history of Tampere, too.

The city was granted the status of a “free city”. The charter issued in 1779 granted the future inhabitants several special privileges in order to encourage economic activity in the area. Tampere was to become a new centre of commerce and industry in Finland, the first major inland city of its kind. Among

the many chartered privileges the most important one was liberation from guild regulations. Every man was free to move in and start an enterprise. The only problem seemed to be the fear that the city would grow too rapidly – the charter provided lots for only 400 inhabitants.

The industrial history of Tampere began with high hopes. Unfortunately the freedom of enterprise did not work. Only few artisans moved to Tampere, and as soon as people were settled they founded guilds and began to regulate the economic activity in the city, that is, the number of burghers and workers, trade and prices. One of their innovations was to set maximum wages for workers in order to impede “unhealthy competition”, or as a prominent member of the city court

*Tampere is located between two lakes. The rapids of Tammerkoski had been a dividing line and a meeting point for local farmers and hunters since the Middle Ages. The first nearby stone church was built in the 16<sup>th</sup> century.*





*Tilsit. Tampere was not discussed in the meeting of the rulers of Europe in Tilsit 1807, yet the next year the inhabitants of Tampere welcomed their new ruler with suspicion and high hopes.*

explained later: “It certainly is not the intention of the monarch that the burghers would eat one another”. Despite its status as a free city, Tampere never experienced a boom of small-scale industry. There was not enough demand for local products.

How did the crown of Sweden get the idea to build a new city between two lakes, but actually in the middle of nowhere? It was expected that there was plenty of iron ore in the lakes, ore that could be smelted in furnaces fuelled by the charcoal available in the surrounding forests. The ultimate goal was to increase state revenue by exporting iron, which was so important for the kingdom of Sweden throughout the 18<sup>th</sup> century.

During the Swedish rule, Tampere remained a tiny village of a few hundred people. The only larger business was a state

distillery. Even this business, a monopoly, failed.

### **The Emperor’s Will**

The meeting of Napoleon and Alexander I in Tilsit in 1807 changed the course of history in Tampere. The two emperors agreed that Russia would attack Sweden. That happened the next year, Finland was occupied, and in 1809 the eastern counties of Sweden were annexed to Russia. The Grand Duchy of Finland was formed. However, Swedish legislation in Finland remained in force, and Finland enjoyed administration of her own including the Senate, State budget, customs area and economic policy. All this affected Tampere greatly, especially when Alexander I reinforced the privileges of the city. He visited the city in 1819 and a memorial plaque from

the time records how he “ordered the natural forces, the rapids of Tammerfors, to serve the purposes of man”.

The words of the Emperor did not help much, but the new Senate of Finland, and the Emperor, now intended to develop the city of Tampere. This opportunity was exploited by James Finlayson, a Scotsman who had moved to Russia and served there as a director of imperial cotton mills in St. Petersburg. His connections to Finland and Tampere were based originally, however, on the Quaker community. He was engaged in selling Bibles.

Finlayson applied for and received an imperial privilege to establish a machine shop, and later a cotton mill. His charter included the land by the rapids, a licence to generate hydro-power, and a release from customs duties. To start the business he was given a generous state loan. But Finlayson was not a very good businessman, and after many attempts he gave up the venture. His small business went bankrupt and he left for Scotland in 1835.

Once again, Tampere seemed not to be an ideal place for large-scale industry. There was the river and the rapids, but nothing else – no raw materials, no skilled labour force, poor communications and no markets.

### Tampere Goes Global

A new perspective towards industrial development in Tampere was opened in the late 1830s, when James Finlayson’s company was bought by two Baltic-German businessmen living in Russia, Carl Nottbeck, a textile merchant, and Carl Rauch, a physician. What they actually gained were the privileges enjoyed by the company. To those were added the freedom of religion and freedom from taxes on foreign specialists. Together Nottbeck and Rauch began a large-scale business in Tampere, building the first real factory in Finland, a cotton mill employing 500 workers in 1836. They succeeded in creating the largest and the most profitable company in 19<sup>th</sup>-century Scandinavia. Finlayson & Company (the name was retained) was a modern capitalist enterprise. The number of workers soon exceeded one thousand, rising to 3,000 by the end of the century.

Nottbeck and Rauch had no large fortunes, but they were financed by the state of Russia and by some British investors. In practice all the start-up money came from European banking houses such as the Rothschilds. Also other resources were of foreign origin: Machines for the new cotton mill were imported from Belgium and Germany, technicians and foremen came from Britain and Sweden, and the bookkeeper from Germany. The raw material, cotton, was imported



The letter of privilege for James Finlayson was signed by “the Emperor’s own hand”.

from the slave fields of the American South, via Britain. Most importantly, the products found a market in St. Petersburg, the rapidly growing Russian capital with more than one million inhabitants. Demand was strong and prices were good, and better still, in Russia Finnish-produced goods were protected from Western competition. The only local resource was the labour force, made up mostly of the children of rural workers in the surrounding countryside.

Technology transfer in those days meant people coming to Finland, and soon Tampere had a small and a highly-respected community of foreigners who did not associate much with local people. The Nottbeck family

moved to Tampere but lived in luxurious privacy, spending much of their time out of the country and educating all of their children abroad. Among them was engineer Carl von Nottbeck who in 1882 brought electric light from New York to Tampere – among the first places in Europe. New technology inspired local people, more and more innovations were made in Tampere, and productivity increased. The first technical school in Tampere was founded in 1886.

### **A Special Economic Zone**

The success of Finlayson & Co encouraged other entrepreneurs to set up businesses in Tampere. By 1900 the number of factory

*The six-storey Finlayson cotton mill erected in 1836 was presented as a major sight in Finland in the book "Finland in Pictures" in 1845.  
© Vapriikki Photo Archives.*



workers in Tampere exceeded 10,000, most of them employed in textiles, metal works and paper mills. Without recounting the histories of other companies, we can safely conclude that without the special conditions, without the institutional position of Finland as a Grand Duchy of Russia, Tampere would not have industrialised as early or as quickly or in the way it did. In present-day terms, Tampere was made a “special economic zone”. The privileges enjoyed by the companies practically negated all existing legislation. The only way to encourage industrialisation in a tightly regulated economy was to grant special privileges. Thus the successful industrialisation of Tampere was not a victory for free competition or for an open economy, but depended on direct and indirect support from the state. Anyway, the policy worked.

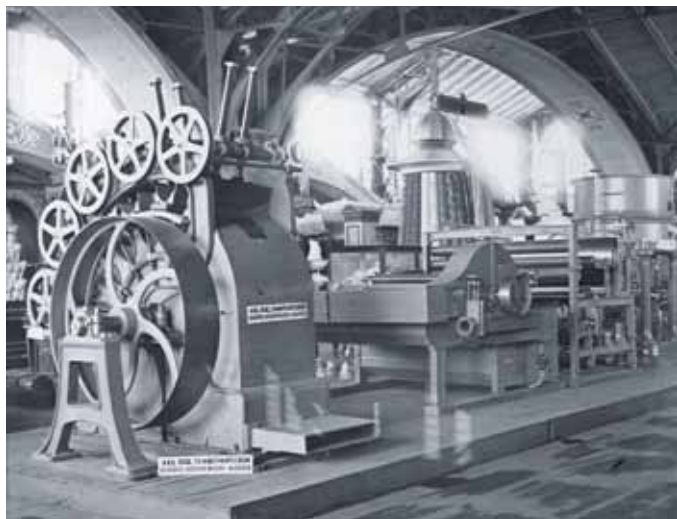
During the latter half of the 19<sup>th</sup> century Tampere, and Finland, was integrated into both Russian and Western economy. A simplified picture of the Finnish national economy was that Finland sold raw materials and other low-tech products to the Western markets and finished goods to Russia, and imported technology from the West and raw materials from Russia. An explanation for this is that Finnish products were not (yet) competitive in the Western markets, but survived in home markets and in Russia due to exceptional customs rules. All Finnish producers, all paper mills included, benefited from reduced tariffs when exporting their goods to Russia, while in many cases Russia imposed tariffs of 70% or more on Western products. Russian entrepreneurs and politicians often

complained about Finland’s special position, but to no avail. Finland remained a separate and privileged customs zone until its independence at the end of 1917.

A major question mark is, of course, why the Emperor favoured industrialisation in Finland – often at the expense of Russian entrepreneurs. The motive was simple: Finland was regarded as an essential and eternal part of the Empire. It was close to the capital, and compared to other parts of Russia, rather well developed. Thus the success of the Finnish economy would strengthen the Empire in the competition with other nations. The political goal of granting Finland a special status was to pacify the country, to separate Finland from Sweden and reward Finns for their loyalty. As Nicholas I put it: “Finland is the only province in my great realm which has caused me no anxiety or dissatisfaction”. There was no hostility towards the Russians in the 19<sup>th</sup> century. Finns regarded themselves to be a part of the Empire “which reached from the islands of Åland to the shores of Alaska, and where the Sun never

*Machinery made in Tampere was advertised at the Industrial Exhibition held in Moscow in 1882.*

© Vapriikki Photo Archives.





*Plevna was one of the factory halls of Finlayson. It was named after the village on Plevna in Bulgaria, where Finnish troops fought in the Turkish War. The factories were recommended for visitors in the first Finnish tourist guide in 1888. © Vapriikki Photo Archives.*

set”, as a schoolbook put it. In the numerous wars in the 19<sup>th</sup> century, Finns stayed always loyal and many served in the Russian army, especially sons of the nobility.

Nineteenth century Tampere shared many features of colonial economies, although we are not used to seeing things in that light: the dominance of outsiders, the importance of foreign resources and the exploitation of cheap local ones. On the other hand, Finland was occupied by Russia, but not colonised by it; there was no capital flow out of the country; and

above all, industrialisation in Tampere was an economic and social success story, not just for the factory owners but also for the locals who experienced it primarily in the form of progress and improved living standards.

### **Out of Poverty**

In the 1860s, Finland experienced a serious famine, right after the “cotton famine” caused by the American Civil War. Thomas Malthus had been right when he predicted a poor future for mankind after studying Finnish population data for his famous book *An Essay on the Principle of Population*. But the famine years became a turning point for Finland, and the reason was industrialisation; it saved Finns from hunger and disease. Workers in Tampere were mostly poor rural people from

the nearby countryside. For them, the factories offered better living conditions, rising wages, opportunities for a decent life, education and social mobility. That was something totally new in Finnish history after hundreds (even thousands) of years of economic and social standstill.

When Tampere was dubbed the “Manchester of Finland”, people took a positive pride in the nickname. Industrialisation in Tampere was not seen as a social catastrophe, but a promise of a better life. In most cases that became a reality, too. More than the Manchester of Finland, Tampere was the “America of Finland” for the rural poor: while 250.000 Finns from the west coast emigrated to USA before World War I, as many people from inland areas moved to Tampere, Helsinki and other industrial sites in the same years.

Despite the severe and continuing political

*The famine years. The British community in Tampere feeds the poor in 1868. The benefactors were photographed before distributing bread for the hungry.*  
© Vapriikki Photo Archives.

crisis, the first two decades of the 20<sup>th</sup> century were a time of unforeseen “new things”. Modernisation ushered in new technology such as the movies and electric cars, as well as new ideas and attitudes: “everything is in a constant and restless movement”, the time was described in a book titled *Modern Times* (1910). A less noted but a vital aspect of modern life was the so-called hygienic revolution based on the new findings of bacteriology. Programmes of public health and environment were introduced, which made the city a healthier place to live than the surrounding countryside. From the beginning of the 20<sup>th</sup> century it was self-evident in Tampere that industrial society would be the only possible future.

### **From Crises to Stability and Growth**

Between 1905 and 1918 Tampere experienced a period of intensive political mobilization and severe political conflicts. The severe economic crisis, unemployment, inflation and shortages of the Great War did not hit Finland before the fall of 1917. Up to that



time Finns, and Tampere in particular, benefited from the war boom. Finland remained outside actual warfare and only small numbers of Finns were engaged in the war – as volunteers in the Russian and German armies. Political crises of the time in Finland, and the Civil War of 1918 in particular, were felt deeply in Tampere. The Civil War was an unexpected national tragedy, which rooted, however, from the Russian revolutions, not from the experience of industrialisation.

Right after the Civil War, a series of social reforms were carried out. These included bills on land reform, municipal democracy, working conditions, public education, tax reform etc. The Reds, who lost the Civil War, won a majority in the city council. The industrial city of big companies was now run by socialists. This meant growing investments in public education and health care, social security and the environment. An American journalist who visited the city in the early thirties wrote that Tampere was “not the Manchester of Finland but the White Pittsburgh of Scandinavia”. The

community adopted a shared positive identity and refused to give up on environmental problems or tendencies of inequality. This idea was reflected in the new slogan of city: “The Beautiful City of Factories”. The growth of industry was not seen as a socially destructive force, but as civilisation. This may be called a social innovation of the time.

The independence of Finland in 1917 brought a radical change in the political and institutional framework of the Finnish economy. Contacts with Russia were severed suddenly after decades of deepening integration. Finland adopted a policy of national industrialisation by improving the infrastructure and by subsidizing exports. Tampere was in a good position to take advantage of such “industrial nationalism”. The times were especially favourable for the development of mechanical engineering, thanks to increasing construction of railways, power stations, power lines,

*Tampere in 1910: Colour picture proves the richness of modern life. © Vapriikki Photo Archives.*



bridges, ships and paper machines. The textile industry grew together with the expanding home market. Tampere retained its position as the number one industrial town in Finland.

### The Renewal

Tampere did not suffer much in World War II. Instead, the city was an important site of armament industry. The old industrial structure of Tampere continued to strengthen both during and after the war, the city produced more textiles, shoes, machines and paper. Much of the increase came from newly opened export market in the Soviet Union. During the 1950s and 1960s Tampere was one of the key areas affected by the bilateral trade agreements between Finland and the Soviet Union. At the same time, European integration deepened and Finland had to face the competition from low-cost economies. By the 1970s the signs of an industrial crisis became more visible, paralleling the decline of old industrial cities around the world. However, the traditional big industries survived until the 1980s due to exports to the Soviet Union and Eastern Europe.

In the 1960s and 1970s Tampere was an industrial city with two faces. On the one hand, it continued to be “the city of factories” recruiting still a new generation of industrial workers, while on the other the city was willing to invest in higher education and research. Two universities were founded and they grew rap-

idly, earning the city a new academic respect. These two worlds, industrial and academic, hardly met but lived side by side. Looking back now, it was a lucky situation: a new knowledge base was gradually developing, and the city avoided the fate of the Rust Belt.

When traditional industry finally collapsed in the late 1980s and early 1990s, Tampere was sufficiently prepared. First the social network of the welfare state saved most of those who lost their jobs. Workers were offered early retirement and re-education. In the more serious situation of the 1990s, the new Nokia-led high-tech sector became the saviour. It brought new jobs and remarkable tax revenues to the city. Most interestingly, much of the “old industry” survived through its ability to develop new high-tech products within traditional fields. Several companies were innovative and strong enough to compete globally. The established co-existence of the old and the new economies and their gradual merger supported by higher education gave Tampere an exceptional basis for its competitive “knowledge industry”. In this sense the industrial history of Tampere never ended but continues to this day, now in a global context just as before. It is perhaps unique in Tampere, how nicely the identity of the old factory town fits within the identity of the new industrial town – the history of industrial society is often relived within a single family. ■

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# The History and Reuse of the Industrial buildings on the Banks of Tammerkoski in the Centre of Tampere

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The City of Tampere is located in scenic surroundings on a neck of land between two large lakes: Lake Näsijärvi to the north and Lake Pyhäjärvi to the south. A one-and-a-half kilometre long river, Tammerkoski, connects the two lakes. It consists of three rapids descending a total of 18 metres from north to south. In the 19th century, several paper and textile mills and machine shops were founded along the banks of the rapids.

There were over 37,000 industrial jobs in Tampere in 1970, but 25 years later less than half of that number. The loss has been offset by a proliferation of jobs in the service sector and in public administration. In the 1960s two universities were founded in Tampere, one of them a university of technology. The Nokia Group has extensive research and development facilities in Tampere.

## **Frenckell 1783–1928**

The Frenckell paper mill was founded in 1783 on the western bank of the middle rapid. The existing façades were designed by



architect Birger Federley in the beginning of the 20<sup>th</sup> century.

The change of Tampere's industrial structure began as far back as 1928 when the Frenckell paper mill was closed. The plot with its buildings was purchased by the municipality with a view to demolishing them to build a new town hall and apartment buildings on the site. The new town plan was approved in 1938 in the City Council. The old beautiful buildings were saved by the Winter War, which began the next year, and the shortage of money that followed. Today the former factories house municipal offices and a theatre.

### **Verkatehdas 1856–1979**

The first buildings of Verkatehdas (broadcloth factory) were built in 1856 on the eastern bank of the lower rapid. In 1968, the company bought a larger plot more suitable for modern industry about eight kilometres east from the centre. The City Council accepted a new town plan for the old site, because the company promised to save the jobs.

The factory was demolished in the late 1970s. Only the main office and a smaller building on the riverbank were preserved. A shopping mall, a high-rise hotel and three blocks of flats replaced it. The demolition decision sparked strong public dissent. Ever since, the general consensus of opinion has been to preserve the remaining old red brick mills, so important to the cityscape and a reminder of the history of the city.

### **Kehräsaari, H. Liljeroos Oy 1871–1983**

On the western side of the lower rapid there used to be a small isle and a tiny metal workshop. Mr. Henrik Liljeroos bought the isle in 1871 and founded a spinning mill on the plot. The isle was consequently named Kehräsaari (Spinning isle). The oldest existing factory was built in 1897 while some of the current buildings are rather new. The spinning industry was closed down in 1983. The former factories now house offices, restaurants, a cinema and even a nice sauna overlooking the rapids, which groups may rent.

### **Finlayson textile mill 1820 – to the 1990s**

Mr. James Finlayson from Scotland came to Tampere from St Petersburg in 1820 and founded a metal workshop to produce tex-

tile machines on the western bank of the upper rapid. However, soon he had to turn the small factory into a weaving mill. Mr. Carl Nottbeck bought the mill in 1836. He and his sons made the Finlayson Company the greatest factory in Scandinavia in the late 19th century.

The oldest existing factory is the “kuusvoonikinen” (“six-floor building”) built 1836, while the youngest building dates from 1960. All in all, the factory had some 110,000 sqm of buildings in 1990, most of them dating back to the 19th century. The factory was closed in the beginning of the 1990s.

The Asko Group bought the company in

*The old industrial areas by the banks of Tammerkoski.  
Map © City of Tampere, modifications Mikko Järvi.*





*Aerial view of the Tammerkoski rapids.*

© Lentokuva Vallas.

1986 and begun to study possibilities to move the factory to a larger site on the outskirts of the town. They arranged an architectural design competition on the reuse of the old site in 1988. This marked the beginning of a long planning process with the municipality, the National Board of Antiquities and the

Ministry of the Environment. The new town plan was adopted in 1995. It preserved some two thirds of the buildings. All the preserved buildings have now a new use: ITC offices, the main office of the regional newspaper, a college, museums, art galleries, restaurants and a cinema complex. A few smaller warehouses were demolished and replaced by new apartment buildings.

## Tampella 1842–2000

On the opposite bank from Finlayson, the Tampella metal and textile works had an industrial plot of about 25 hectares along the Tammerkoski river and Näsijärvi lake. The first blast furnace was built in 1842. The last workshops in the area were closed in 2000, although some sectors of production are still working in the suburbs.

The company and the city arranged an architectural competition for the reuse of the area in 1990. The new town plan was adopted by the City Council in 1995. About 60,000 sqm of old factories were preserved. The plan allowed also about 160,000 sqm of new flats and offices to be built in the area. All the old red brick factory buildings alongside the river



*Finlayson factory buildings at the end of the 19th century. © Vapriikki Photo Archives.*

*Finlayson area today.  
© Petri Pussinen.*





*The old linen factory and engineering workshop buildings of Tampella. © Mikko Järvi.*

are preserved, housing now offices, the Law Courts of the Tampere Region, and the City Museum “Vapriikki”. Some factories from the 1950s and ‘60s behind them are replaced by modern apartment houses with almost 2000 inhabitants. The northern part of the plot on the shore of the Näsijärvi lake is still under planning.

### **TAKO 1865–**

Mr. Fredrik Idestam founded a paper mill on the western bank of the lower rapid in 1865. The existing buildings were built in many stages mainly between 1923 and 1974. The TAKO cardboard mill, a very impressive factory in our townscape in the very centre of the city, is still working today. There is often plenty of smoke coming out of the 92-metre tall smoke stack and several smaller pipes. However, it is only steam.

The factory will be closed some day in

the future, but I am sure that the buildings will stay in place in the heart of Tampere. They might be used as a shopping centre, offices or perhaps for housing or museums, too.

### **The water power plants**

There are four water power plants in the rapids. At the upper fall, the Tampella power plant was built in 1916 and the Finlayson plant in 1926. The municipality built the plant in the middle rapid in 1932. These three plants are now all owned by the City of Tampere. The Alakoski power plant in the lower fall was built in 1937 and is owned by a private company.

All the power plants are important for the Tammerkoski industrial area and townscape. However, today they produce less than five percent of the total electricity consumption of the town.

### **Tammerkoski – a UNESCO world heritage site?**

The City of Tampere grew along the Tammerkoski rapids. The waterfalls, the red-brick factory buildings with their smoke stacks edging the rapids and the green parks now surrounding the once-industrial sites are the most important feature of the cityscape of Tampere. In 1995, the Ministry of the Environment designated the industrial cityscape of the Tammerkoski rapids as part of the Finnish national heritage. This was the first time in Finland that this status has been granted to an urban environment.

The centre of Tampere and the main shopping areas are located on both sides of the river. On the banks there are parks, restaurants, theatres, hotels, a stadium and offices in the old factory buildings. The banks of the rapids

are and will be developed in the future as the recreation and entertainment centre of the city.

There are lots of old factories in new uses in many cities in the world, but I do not know of any other town where the preserved factories are located so well and nicely in the centre with beautiful parks alongside the rapids.

The UNESCO World Heritage List includes many old churches, castles, palaces and cities, but only few factories or industrial sites. Our City Board has suggested that Tammerkoski rapids with its banks should be added to the Heritage List.

Sometimes in a restaurant the pessimist looks at his or her wine glass, thinking – it is half empty. The optimist look at his glass



© Mikko Järvi.

with pleasure – it is at least half full. The City of Tampere is thinking – **We have preserved much more than a half! ■**

### Links to additional material:

1. Power from the rapids

<http://www.history.tampere.fi/main.htm>

2. Pirkanmaan teollisuushistoria, Tammerkoski (in Finnish)

<http://www.akseli.tampere.fi/koski/tre.htm>

3. Tammerkosken muutos ja rakennusperintö (in Finnish)

[http://www.rakennusperinto.fi/rakennusperintomme/artikkelit/fi\\_FI/tammerkoski/](http://www.rakennusperinto.fi/rakennusperintomme/artikkelit/fi_FI/tammerkoski/)

4. Finlaysonin alue (in Finnish)

<http://www.finlaysoninalue.fi/>

<http://www2.finlayson.fi/finlayson/historia/>

5. H. Liljeroos Oy, Kehräsaari (in Finnish)

<http://www.hliljeroos.fi/>

6. TAKO

<http://www.m-real.com/company/productionunits/tako/Pages/Default.aspx>

7. Tampella

<http://en.wikipedia.org/wiki/Tampella> (in English)

<http://fi.wikipedia.org/wiki/Tampella> (in Finnish)

# The Industrial Landscape of the Verkatehdas Mill in Tampere

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## Valuating industrial landscapes

In the 1960s, the townscape of Tampere was to change permanently. Tampereen Verkatehdas oy was relocating its functions to the suburbs and had commissioned a plan where the old mills in the rapids of Tammerkoski were to be swept away and a new complex of housing and offices to take their place. The new plans for the site launched an argument on to do with the old industrial plants. With its dramatic twists and turns, the process for the preservation of the Verkatehdas mill area received wide national visibility.

Before the Verkatehdas case the preservation of industrial areas had not been raised as an issue in public discussion in Finland. The case therefore marks a turning point in the industrial landscape. The term landscape is often used in arguments for and against preservation. The values and meanings as well as historical definitions attached to the landscape are all cultural agreements. Someone has always the power to define what can be seen in the landscape, or how the landscape is marked out as it was in the case of the Verkatehdas mill.

The aim to preserve the Verkatehdas mill



area showed how the valuation process was about power. The discussion on the valuation was not automatically opened to the public. The co-operation on the decision-making level, i.e. between the town officials and the executive management of the Verkatehdas company, and later with the developer, showed that they had the power to ignore other opinions either national or local. In the first years of the 1970s, the case got more publicity and the discussion was opened to new actors such as the National Board of Antiquities (NBA), local civic organizations and the city dwellers. The wider discussion of the case eventually had impact on the changing image of the landscape.

Since the 20th century in Finland, the term landscape was connected to landscape painting and literature. Typically, landscape was understood as a delimited, one-dimensional view. Although a physical landscape is not a stagnant photo or an abstract space, these historical meanings still influence the use of the term. Geographer Petri Raivo sees the landscape as an iconological synthesis where landscape is depicted, analysed and interpreted as a physical place, but also as a historical process and as images, values and meanings bound to their time and society. Landscape therefore includes also those mental images, values, memories and meanings that are present when we look at the landscape. Changes in society influence the way we see landscapes, in this case an industrial landscape. For example, until the growth of unemployment in the 1970s, films and photos of Tampere aimed for tourists depicted a city of factories. The factories of Tampere represented the wealth of the town and of its citizens.

The arguments for and against the preservation of the Verkatehdas mill area showed also the weak points in the preservation law. The values and meanings defined as worth preservation in the Building Act 1958 referred to views, to townscaping and the aesthetic landscape, in other words, to the beauty of the site. On the other hand, what was excluded from the final bill for the Building Act tells more about the values and ways of thinking of that time. During the parliamentary proceedings, the words "... to prevent building/development unsuitable to surroundings" were struck from the bill. It was characteristic of town plans of the time that new plans stood out from the existing urban structure. In the case of Verkatehdas,

this can be seen especially in the statements of the town officials, but also in the comments of town dwellers. New and different, modern was better than the old.

The economic profitability of preserving and reusing existing buildings was left out from the Building Act. The city as a living and changing organism posed a challenge to the preservation authorities as preservation was generally seen as something opposite to urban development and renewal. In practice, preservation therefore began with the determination of a use for the protected building, and that was then used to justify preservation.

In the case of the Verkatehdas mill, it was a large area full of industrial buildings. The old-

*"The brick wall" of the Hatanpään valtatie street consisted of three factories which were built in different decades, yet created an unbroken whole lining the street. The oldest part at right was built in 1923 (architect Wivi Lönn), the part at left was built in 1936 and the one in the middle in 1963 (Matti Lampen). © Paavo Korhonen 1970. Vapriikki Photo Archives.*





*A painting based on a German drawing from 1928 of the Verkatehdas area. Given that the company used as its logo a panorama of the factory area, the landscape had aesthetic value for the company. The landscape can actually be seen to represent the company even internationally as late as the middle of the 20th century.*

© Tamfelt Photo Archives.

est buildings on the site were from the mid-20th century, whereas the newest factories were built in the 1960s. Active construction lasted to the mid-1960s, when it was realized that the plot was too small for any more extensions. Red brick as a building material linked the older parts to the new ones, creating a continuum where factories built in different times subtly differed from each other. Even the newest factories were built from red brick to maintain the unity of the area and to preserve the character of the site.

### **The new town plan – modernizing the city centre**

The Verkatehdas company decided in 1965 to move away from the city centre. The same

year they commissioned a well-known architect, Professor Olli Kivinen, to draw up a plan for the site to facilitate selling of the plot. After negotiations with leading town officials, the board of the company requested a new town plan.

A draft for the new plan was published in February 1969 and was accepted in March the same year. Drawn up in the town planning office, the plan contained only very few stipulations concerning the new townscape. In the newspapers, however, it was emphasized that the new buildings would have the same kind of red-brick façades as the old ones. Although this was mentioned in the town plan draft report written by Professor Kivinen, the draft was not presented in public or accepted (see

Appendix). Instead of the town plan, more attention in the media was given to Kivinen's plan which the company published a few months later. Thus the facts of the town plan mingled with the information in Kivinen's reports from the very beginning.

The maintenance of the existing character of the townscape was thus considered important already at this point in time, although change in general was seen as a positive phenomenon. In a statement by the town office it was also emphasized that the previously closed industrial area and the banks of the river would finally be open to the public. After all, the river was perceived as an important and beautiful part of the town. The town director Lindfors had pointed out this fact from the very outset of the negotiations with the executive management of the Verkatehdas company. In fact, the starting point for Lindfors was that, from the perspective of the townscape, the best outcome would be achieved by demolishing the factories and replacing them with new quality architecture.

Preservation and reuse were not an option at this point. Instead, as mentioned in the town plan report, the site was too valuable as an industrial location which was seen the only alternative.

The important thing was that under the contract made between the town officials and the company managers, the town would obtain part of the area in exchange for a higher building volume in the main lot. The leading town officials were already at this point thinking about preserving the old headquarters of the company located in this area. Considering that the Verkatehdas company was relocating its new factory to the outskirts of the town, it is easy to understand that the town authorities supported the company's decisions.

### **The amendment – plans for multi-storey buildings**

In 1972 a potential buyer for the area emerged who requested the town plan to be drafted again. In the new plans drawn up by Keskus-Sato, there were five 11-storey residential buildings and one 17-storey office building. The growing criticism towards the new plan by the end of 1972 is apparent in newspaper articles as well as in the statements and actions of the town officials. Up until then little attention had been paid to the planning process: the negotiations between the town and the company were not public and even the town plan had been drawn up and accepted without greater notice.

In response to the criticism, the town authorities emphasized that the amendment was better than the original plan, because more was preserved in it than in the original town



*The Verkatehdas area in 1947.  
© Vapriikki Photo Archives.*

plan. Since the Dye Works was included in the area owned by the town, the amended plan made it possible to preserve two buildings instead of one. Moreover, the town plan did not stipulate any specific type of construction, whereas in the amendment it was specified that the façades should be of ceramic stone material or something similar. This was in keeping with the idea that the amendment would preserve the typical and familiar red-brick characteristics of the townscape.

The negative expert opinions regarding the amendment showed that the new plans for the central area were not a success. For example, the National Council for Architecture criticized that the multi-storey buildings in the plan violated the area's character. As they saw it, it was important to maintain the traditional way of building, with red-brick walls lining the streets and coming straight up from the river bank. The new buildings should have been planned to harmonize, not stand out from the existing built environment.

In the amended town plan, the height of the buildings and their façade materials were based on the developer's plans. In other words, it was the developer's view of the townscape that was to be realized. The idea was to develop the valuable plot with low-budget mass produced buildings to maximize the profit. With the town officials taking the developer's side, the contradiction between an important and valuable renewal of the townscape and the developer's plans was all set. Or as one statement of the town plan committee defending the new town plan put it, beauty lies in the eye of the beholder. This kind of an interpretation was made possible by the preservation paragraph in the Building Act of 1958. It was pointed out in the statement that the height, façade material and appearance of the

new buildings were matters of opinion that could not be defined in the town plan. What, then, was the purpose of the town plan if not to preserve the townscape values and to direct the manner of building? Even if the amended town plan was considered better just because of the more exact construction orders.

In my opinion, the preservation debate started partly with a view to prevent the realization of the developer's plan. Big headlines in the newspapers pointed to the radical change that was to take place in the heart of the city. When the discussion on townscape values was opened to the public, also the possibility to preserve the existing landscape was noticed.

### **Preservation discussion**

The site was a very valuable location on the banks of Tammerkoski. The town officials saw its value first and foremost for the inhabitants. Previously most of the banks of Tammerkoski had been closed for others than factory workers. When the Verkatehdas company told about their plans to relocate the factory from the center, the town authorities saw this a chance to open up the banks. For them, the new plans represented an open townscape, whereas preservation evoked images of closeness and darkness. Secondly, the site was valuable as a construction site. In other words, it would bring economic growth to the centre.

From the start, the aim was to demolish the industrial buildings and to improve the townscape with quality architecture. The site was too central and valuable to serve as an industrial location, which was seen as the only reason for preserving the old factory buildings. The town authorities' idea of modernizing the townscape was also contradictory to the preservation of the factories. Industrial

areas were something new in the field of preservation in Finland. Even the representative of the NBA, Pekka Kärki, to whom the case of Verkatehdas was assigned, admitted that he had no idea what there would be to preserve or what it would mean, although he was convinced on his first visit to the site. The small resources of the NBA were at that time mostly allocated to the preservation and documentation of old castles, churches and manors.

It is easy to see from newspaper articles that by the time when the discussion on the preservation of the area began, the Verkatehdas mill area was seen as a workplace, and the factory halls carried mostly negative connotations. One frequently mentioned item was the long red-brick wall facing the Hatanpään valtatie street; it was seen as ugly, dirty and blocking the view.

Most of the discussion took place and statements were issued in the first half of the 1970s during the legal processes on the amended town plan. In 1974, the National Board of Antiquities presented the protection of the seven oldest industrial buildings in the southern part of the site. Before that date, the NBA had tried to influence the planning process instead of presenting proposals for protection as that was perceived too radical an action. Even the protection proposal made by the NBA allowed most of the plot to be built anew, but that would have required a new town plan, something the town was not willing to make. The grounds for protecting only seven of the buildings instead of the whole area was based on the fact that the NBA did not want to limit new construction unreasonably. As Pekka Kärki from the NBA commented later on, the game was already over at this point, as the new town plan with its massive building volume would have meant

claims for damages. The Building Act from 1958 favored the owner.

The town government had decided to preserve the headquarters of the Verkatehdas mill because of its architectural values. The Dye Works was also seen to have some historical significance, although Onni Mikkonen, a representative of the town, said in a newspaper story that none of the buildings had such cultural and historical value which would require their protection by law.

Although the usual method of preserving buildings was in the town plan, in this case it was not used. Only the preservation of these two buildings was mentioned in the plan. As the town authorities saw it, the preservation of these two buildings would guarantee the preservation of the townscape that was familiar to the town dwellers. Furthermore, in a statement of the town government, the factories recommended for protection by the NBA were considered dilapidated and therefore of no value.

In the arguments presented by the town actors, the important townscape was restricted to two buildings. In other words, even the town officials admitted that the landscape had some value, even though they held their ground that none of the buildings had any importance by themselves. Instead, it was the familiarity of the townscape which was valuable in their opinion.

The statements of the executive management of the Verkatehdas company paralleled those of the town authorities. In addition, they emphasized the ugliness of the factories. In principle the argumentation was contradictory to the built environment. Still in the 1960s, the use of red-brick façades in new buildings in the central plot meant that the new parts of the factory area were planned to

fit in their surroundings. In the same way, the use of famous architects and the discreet continuum between the old and the new buildings favored the aesthetic point of view.

The National Board of Antiquities emphasized the significance of the entire area, its cultural and industrial history, as well as architectural importance and townscape values. The local civic organizations used the same arguments, but they especially emphasized the local significance of the industrial area and the townscape. For instance, they presented the area as an industrial park where most of the factories could be preserved and the banks of the river would be open to all. In particular they pointed out the meaning of the industrial landscape to the city dwellers and to the character of the town.

The political left also took a stand for the preservation of the area. For them, it was the workers' history that was to be demolished with the buildings. They also brought up the economic reuse of the factories. By the 1970s, Tampere had already begun to reuse old factories. In 1965, at the same time as the negotiations between leading town officials and the Verkatehdas company started, the local council had decided to buy an old weaving mill in Satamakatu street. The office of social services was located there. This shows that, at a time when new construction production was the main way to renew the town, the reuse of old buildings was seen at least partly in economic terms.

Two surveys made by the local newspapers Aamulehti (1974) and Tamperelainen (1976) showed that in the case of the Verkatehdas mill area, preservation was an issue of visual townscape. Most of the comments concerned the beauty or the ugliness of either the factories or the planned multi-storey buildings.

During the preservation process of the Verkatehdas area, most of the commentators did not perceive the importance of the factories in terms of their own local culture and history. Moreover, those opposing preservation saw it as stagnation; it would prevent the development of the town. For them, just as for the town officials, the new town plan signified a move forward for the town. Progress was seen as a positive thing without questioning the quality, architecture or townscape values of the new plans. The opposition between stagnation and progress, just as the opposition between open and closed, is one example of the antithetical patterns which influenced the discussion of the meanings of the industrial landscape from the very beginning.

During the years 1975-77, several excursions were made to the area for the purpose of proposing to various instances their relocation to the possibly preserved factories. At this point, the reuse of the factories was extended from other industry to include also such instances as the universities of Tampere, the Police School, the Nordic Art Centre, the Film Archive etc. It was the lack of money that prevented the preservation of the area. Neither the town nor the State were willing to purchase the area.

Despite the fact that the Supreme Court saw the area of the Verkatehdas mill as having cultural, architectural, industrial, historical and townscape value, in 1977 the Government decided to revoke the protection order, since protection would have incurred too many expenses to the owner. After several years of legal processes, valuation and delegated decision-making, only two buildings were left in the area – the ones which the town authorities had promised to preserve in the very beginning.

### **The symbolic value of the lost landscape**

In the Verkatehdas case, the valuation of industrial heritage was tightly connected to the everyday landscape and to memories of the place. The open and modern image of the renewing landscape made preservation seem dark, dirty and stagnated, just as the brick wall in the Hatanpään valtatie street was depicted. Only the demolition of the familiar view made the town authorities understand what was unique and important in the city center. By the 1980s, the values emphasized

by the local civic organizations and the political left had become the majority opinion.

The media and especially photos in the newspapers had a great impact on the valuation process nationally. Photos of the half torn down factory, or of the demolition of the chimney, had a symbolic value that had a far-reaching impact. For instance, in 1984 Alpo Korkeela, a member of the town government for several years, wrote in the *Aamulehti* newspaper how only the demolition of the factories awakened the town authorities to understand the unique character of their home town. In the late 1970s and

*The demolition of the chimney on 1.10.1977. In the master plan of 1974 it was noted that the old chimneys in the city centre had considerable symbolic value and should not be torn down without reason. This did not save the chimney of Verkatehdas, however. Published in Hahtuvia 4/1977.  
© Tamfelt Photo Archives.*



early 1980s, when the old factories were demolished one by one, newspapers published touching headlines on how the old plants were fighting against and mocking their destroyers by standing fast. The value and importance of the preserved buildings was listed subsequently in town publications. Already in the master plan of 1974 these buildings were listed worth saving. But it was not until 1986 that they were recorded as being protected and having architectural, cultural-historical and townscape value. By the 1980s, the atmosphere had turned in favor of industrial heritage. This was partly due to changes in society. With two universities and new technological industry, the image of Tampere grew from that of a factory town to include other sectors as well. In the new atmosphere it was easier to link positive meanings to industrial landscapes.

One might say that the Verkatehdas case represented the first phase in the process of ascribing a value to built industrial heritage in Tampere. Even if the prospective cases, Tampella and especially Finlayson, took place in a more positive attitude and in co-operation with the conservation authorities, gaps remained in the preservation process. What was particularly apparent already in the Verkatehdas case was the power of the developer to influence to the outcome of the planning (and preservation) process – i.e. economic facts passing other values.

The reuse of old factories has shown that even with new functions the buildings still carry within them historical meanings and memories of the past landscape. Already in 1980s, when the Verkatehdas area was still under reconstruction, there were several new projects in the city centre relating to the reuse of old factories. In 1986, the town launched,

in co-operation with the Technical University of Tampere, a research project on the reuse of old industrial areas. On the other side of the Tammerkoski river, the owner of the Liljeroos factory on the Kehräsaari island closed down the industry and turned the old factory buildings into offices and small boutiques. The Lapinniemi cotton mill was refurbished into housing and hotel facilities by the 1990. The Klingendahl factory block in the Hämeenpuisto park was turned into apartments and offices. The value of old factories and industrial areas as the essence of town history was understood by the end of the 1980s. The beautiful city of factories, as the slogan of Tampere ran in the 1940s, had become aware of its past.

### Appendix

The main stages of the case of Verkatehdas

**30.6.1965** The executive management of the Verkatehdas company commissions Professor Olli Kivinen to draw up a plan for housing and offices.

**8.12.1965** Professor Kivinen presents his plan to the town manager Erkki Lindfors and the assistant town manager Sampo Toni. Lindfors encourages the company to take action.

**6.7.1967** The company submits to the town government a proposal to revise the town plan.

**13.3.1969** The town council approves the new town plan.

**24.4.1969** The company organizes an information meeting to promote the selling of the plot.

- 25.4.1969** First pictures in the newspapers presenting Kivinen's plan.
- 13.5.1971** Ministry of the Interior confirms the new town plan.
- 16.9.1971** The town authorities and the company executives sign a contract whereby the company donates part of the plot to the town. Under the contract, the company is obligated to tear down the old Dye Works located in the area. The content of the contract had already been negotiated in 1968.
- 18.10.1971** The developer Keskus-Sato requests for the town plan to be drafted again. The request includes the developer's plan for the site.
- 7.3.1973** The town council approves the amended town plan based on the plans of Keskus-Sato Oy. The Ministry of the Interior states that there will be delay in the case due to two complains in the matter.
- 31.5.1974** The Ministry of the Interior confirms the amendment despite negative expert opinions. Pirkanmaan perinnepoliittinen yhdistys and Pirkanmaan luonnonsuojeluyhdistys appeal against the case.
- 11.10.1974** The National Board of Antiquities presents the protection of the seven oldest buildings in the area.
- 20.12.1974** The County Administrative Board of Häme issues a preservation order (rakennuskielto) for six months to the site.
- 22.1.1975** The town and the Verkatehdas company appeal against the preservation order.
- 2.4.1975** The Supreme Court confirms the amended town plan.
- 17.3.1976** The Verkatehdas company starts the demolition of factories number 3, 4 and 5 which are covered in the protection process, but the preservation order for which is no longer valid. At the same date the Government decides on the protection of factories number 4, 5, 6 and 7.
- 28.1.1977** The Supreme Court decides to revoke the protection decision made by the Government as being too damaging.
- 8.6.1977** The Government decides not to purchase the area.
- 16.6.1977** The Government passes its resolution. The preservation order is revoked.
- 1.9.1977** Demolition work starts again. During the autumn factories number 4 and 5, the chimney and a workshop are demolished. ■

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# Architectural and Historical Values of Technical Services in the Reuse of Industrial Buildings

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## Introduction

Successful reuse of an industrial building depends on its location, quality, and architectural and structural capacity. Mechanical and electrical installations should be appreciated as an integral part of the architecture as well as artifacts of industrial design. However, in most cases new uses for buildings set requirements for energy efficiency and indoor air quality due to the mitigation of green house gas emissions and adaptation to climate change.

This study focuses on the cultural and historical values and conservation of mechanical and electrical installations in historic industrial buildings, especially in the case when an industrial building is converted to another use.

The first part of the study tells about the history of mechanical and electrical installations such as heating, fire safety, lighting, electricity and air-conditioning. The industrial city of Tampere has a nationally recognized status in the presentation of early innovations and devices. The second part discusses building conservation issues, and the requirements



and expectations assessed by new users and authorities.

The aim of this study is to get a better understanding about the possibilities and challenges in how to reuse industrial buildings without compromising their architectural stratification and integrity.

## Industrial buildings in Finland

Industrial buildings comprise a very diverse group of buildings: manufactures, workshops, warehouses, headquarters, dwellings and powerhouses situated in urban contexts or in the countryside. In Finland industrial buildings were identified as heritage in the

1980s [Martinen 1985], and conversions of industrial buildings were often presented in architectural magazines. [Putkonen 2001, 128–130] Commonly identified values in industrial buildings were environmental, social, historical and architectural values. [Putkonen 1988] Soon after, issues concerning 20<sup>th</sup> century “modernist” buildings were also reported. [Tuominen 1992] The Tammerkoski rapids area has been identified as a nationally significant industrial heritage site. [NBA 2010]

### **Historical and cultural values**

The reason for protection is determined by values. The criteria commonly used to evaluate historic buildings are basically the same for all building types: for example, typicality, rarity, stratification, unity and integrity are all terms used to appraise buildings. The criteria mostly focus on architectural or structural features of the building, although in many countries listed criteria also include promotive and innovative features, technological innovativeness or virtuosity, technical authenticity, as well as engineering skills. [Tuominen 1992] In Finland, too, technical systems are particularly mentioned in the Act on the Protection of Buildings 2010.

According to Sir Bernard Fielden and Jukka Jokilehto, a monument or site nominated to the World Heritage List must meet the criteria of authenticity in relation to design, workmanship, material and setting. [Fielden and Jokilehto 1993, 16-21, 66-67]

### **History of technical systems in industrial buildings**

Machines and installations needed by the industrial manufacturing processes were naturally the most important technical systems in

industrial buildings. However, already from the 19<sup>th</sup> century onwards, technical systems were also used to improve the health and safety of workers. [Bradley 1999]

In Finland, most of technical innovations that improve everyday life in dwellings were introduced during just one decade, 1882–1891. In the 1880s amenities developed as systems with an infrastructure instead of being movable objects as before. Some technical services such as air conditioning were originally developed because of the demands of process technology, and only decades later used for the convenience of workers. [Ingels 1952] In the 1880s, technical equipments such as lamps, water taps, water closets, lifts, and steam and low-pressure hot water central heating devices were designed in a Neo-Renaissance style by mechanical engineers. Know-how came from abroad, mostly from Germany, Britain and Sweden.

With the growth of national identity in the 1890s Finnish architecture adopted a National Romantic style. In the Golden Age of Finnish Art 1895–1905 architects designing mechanical and electrical systems for buildings aimed at a “total milieu” following international models and patterns. During the architectural periods of Functionalism and Modernism, in fact already from the 1920s Machine Age onwards, technical devices were part of the authentic design of architecture.

However, industrial companies have not taken the full advantage of their own architecture. [Mikkonen 2005, 207, 214] Actually, it is quite a paradox that manufacturers, factory directors and building owners are not more interested in preserving the mechanical and electrical systems of their buildings. Technical services are machines themselves, industrially manufactured, mass-produced; therefore

they are emotionally and aesthetically close to industrial buildings and should inspire their owners.

## Heating

Radiators, pipes and boilers for centralized heating were an important field of metal industry in the end of the 19<sup>th</sup> century, produced for example by Åbo Järnmanufaktur in Turku. Many industrial buildings did not need heating because of the heat produced by the manufacturing process. Therefore, in the reuse case, heating systems have to be constructed just like in a new building. Radiators under the windows form a nice rhythm and repetition, which is so familiar and typical to industrial buildings. Radiators made of heavy-looking iron instead of light sheet metal also contribute to the atmosphere of an old industrial building.

## Floor heating

In Modernist corporate buildings, such as offices and administrative buildings, centralized heating with hidden water piping was very typical. Modern architecture appreciated

open views to nature undisturbed by any devices, as at Hyvon-Kudeneule in Hanko by Viljo Revell. [Mikkonen 2005, 184] Water circulating floor and ceiling heating systems were developed to make heating solutions less visible. In the case of reuse, floor or ceiling heating are hard to repair because of the pipes hidden in the concrete structures. In the restoration of the Kudeneule headquarters, heating radiators were regrettably added in front of the windows, thus disturbing the atmosphere.

## Sprinklers

The first water pipe and sprinkler system in Finland was installed in Tampere at Finlayson's cotton mill in 1892 – at the time owned by the industrialist Wilhelm von Nottbeck. [Juuti 2001] The Finlayson cotton mill was originally built in 1836, and it was converted into a museum in 2005 by architect of office Lasse Kosunen. The old sprinkler system was preserved and supplemented with a new one. Even the water tank was been preserved. [Museum Centre Vapriikki; Finnish Labour Museum Werstas]



*Old downward facing sprinkler heads were supplemented by new pipes and sprinkler heads facing upwards. Renovation Architect Studio Lasse Kosunen 2005. © Seija Linmanmäki, 2010.*



*In industrial lofts, closets were often located in staircases, such as here in the old Finlayson Cotton Mill.  
© Seija Linnanmäki, 2010.*

## **Water**

The industrial production of sanitary china and earthenware started in Finland very early, in the 1860s, by the Suotniemi earthenware company (1842–1893), which manufactured water closets for large hotel projects in St Petersburg by Master Gregory Holden, born in England in 1814. Suotniemi also produced technical porcelain. [Hyvönen 1993, 42-49, 52] Unfortunately none of Suotniemi sanitary ware has been preserved. None of Finlayson's early water closets or other sanitary artifacts have been preserved either.

## **Natural light in industrial buildings**

One of the most important factors guiding the development of factories was the need for light. Proper lighting was essential for productivity. All industrial buildings, from single-storey production sheds to multi-sto-

rey industrial lofts, were developed in order to get as much natural light into the building as possible. [Bradley 1999] Natural light was cheap (free) and many types of constructions were invented: natural light from the ceiling, skylights, saw-tooth constructions, etc. In Finland, Markku Norvasuo has written a thematic research on skylights and artificial lighting in 20<sup>th</sup> century industrial architecture by Alvar Aalto. [Norvasuo 2009]

## **Electricity**

In the Nordic countries artificial illumination was essential due to the short daylight time in the winter. Daylight was supplemented by artificial light: first by burning wooden shingles, then with oil lamps and gas lights. The first indoor electrical lighting in Finland was introduced here in Tampere at the Finlayson cotton mill in March 1882. Engineer Carl von Nottbeck, the eldest son of the industrialist Wilhelm von Nottbeck, had worked for Thomas Alva Edison in America. Edison's light bulbs were imported, but the hangings and fittings were made from wood locally by the craftsmen of the Finlayson company. [Myllyntaus 1991] Examples of the equipments have been preserved in the collections of Tampere museums.

## **Mechanical ventilation - moving air with small electric motors**

Modern systems of mechanical supply and exhaust ventilation developed after the invention of electric fans. The famous American Carrier Weathermaster system [Ingels 1952] was introduced in Finland after the Second World War. [Putkonen 2010] It was imported by Valmet, a state-owned company which also manufactured airplanes. The Carrier Weathermaster system for mechanical exhaust and



*On the left, electric lighting in the Plevna weaving hall at Finlayson's cotton mill. On the right, Edison's light bulbs and hangings and fittings made from wood. © Vapriikki Photo Archives.*

supply ventilation was imported at the end of the 1940s by the Valmet company, and was produced in Linnavuori Tampere and Pansio Turku. [Björklund 1990, 210-211]

### **Challenges in the renovation and conservation of industrial buildings**

Currently, the most serious threat to the historic architecture of existing buildings seems to be the demand to reduce greenhouse gas emissions and mitigate climate change. These threats affect both the structural aspects as well as technical systems in heritage buildings. Structural changes have harmful effects on the building envelope, walls, roofs, windows and doors. Authentic interior surfaces as well as external façades are covered over by additional thermal insulation. Windows and

outer doors might have to be replaced with new ones. Additional technical services for heating, cooling and ventilation are used to ensure indoor air quality.

As already mentioned, technical devices are a neglected part of historic architecture even in industrial buildings. There are many controversial objectives and concurrent demands for preservation and regeneration which all affect the historic fabric. Most often, preservation focuses on the actual building, and technical devices and installations are considered disposable waste. In most cases, technical services are seen as the layer that is sacrificed in order to preserve the architectural form and keep the building in use. Unfortunately, this seems to be an attitude shared also by building conservation professionals.

## **Principles of building conservation**

Many governmental and non-governmental organizations have launched principles and recommendations for building conservation, starting with the Charter of Athens in 1931 and continuing on to the charters, principles and recommendations of ICOMOS and DoCoMoMo. In 1991, the Council of Europe promoted a recommendation on the protection and conservation of the industrial, technical and civil engineering heritage in Europe. As generally agreed mechanical and electrical installations and devices are part of the architecture and of interior design, and should be preserved in relation to the building itself. Nevertheless, technical installations are not covered specifically in building conservation principles and recommendations.

It therefore seems that the most important value of an unused industrial building is its use value. A building has to be useful for somebody to be preserved, and this requirement concerns industrial buildings just as well as other building types. Use value is enhanced also in article 5 of the Venice Charter from 1964.

## **Reuse, renovation, conversion, restoration, conservation in practice?**

To find a new user, unused industrial buildings have to meet many requirements. The location will usually determine whether a new use will be found or not. Old factories located in cities as part of the townscape often get a new use easily due to their central location. Also the state of condition is significant for the preservation decision.

Industrial buildings typically have large volumes, extended horizontal lines, rhythm, repetition and strong contrasts in building

materials and scale. They have easy access to water and energy sources.

A common approach to the renovation of industrial buildings is to use only the architectural space as raw material for a totally new use and new design. Technical devices are considered to be only short-lived machines with a much shorter life cycle than building structures.

In renovation design, rough and ugly is often considered interesting and beautiful, and the contradiction between rough and smooth, dark and shiny, is seen as desirable. Stainless steel is a symbol of the reuse of industrial heritage. Modern additions carry the contrast between old and new.

Industrial artifacts are usually mass-produced items of anonymous industrial design, which makes their identification challenging for people involved in renovation projects. Aesthetically educated architects and art historians appreciate different features than managers and engineers with an education in economics and technology.

## **Legislation requirements**

The demands and requirements for an old building in the case of reuse are assessed, not only by the new user, but also by authorities. Major renovations can be implemented only by permission of local building control authorities. General requirements for such aspects as accessibility, indoor air quality and energy efficiency are laid down in the National Building Code. [Ministry of the Environment] Under Section 13 of the Land Use and Building Act 132/1999, building requirements only apply to new buildings. However, reuse, conversion and major renovations are usually considered new building.

In the near future, the requirements for re-



*Old lifting hook and crane preserved in the Finlayson power station operating a Sulzer steam engine. Architect C. Sequin-Bronner 1899. At the back is a spinning mill called Siberia, converted in 2001 into a restaurant and a printing house for the Aamulehti newspaper, design by Arkkitehtikonttori Petri Pussinen. Old technology has been preserved as non-functioning relics because this sort of visible stratification reminds us of the industrial past.*  
© Seija Linnanmäki, 2010.

use, conversion and major renovations will be tightening due to the demands for the mitigation of greenhouse gas emissions. The requirements for energy efficiency in the Energy Performance of Buildings Directive 2010/31/EC have been extended to apply to existing buildings as well. The Ministry of the Environment will draw up a new Building Code for existing buildings. The Directive has in its Article 4 an option for officially protected buildings to be excluded from the scope of the Directive; nevertheless, we do not know how this exemption for heritage buildings will be nationally implemented in Finland.

### **Skillful craftsmanship**

The fascination of industrial heritage is in large quantities, rhythm and repetition. We have in Finland educated conservators working with lamps, radiators and wood burning stoves covered with sheet metal, as well as masons repairing old fireplaces and stoves. In a renovation project, time is needed to find out the proper conservation methods for the materials, which in the European decorative arts are metalware, ceramics and glassware. However, if the quantities are huge, conservation is also expensive.

### **In conclusion**

Indisputably, technical devices are an important part of industrial design as well as part of the history of technology – they should be preserved and conserved. In this presentation, I have considered possibilities for reclaiming industrial heritage buildings back into use without compromising their authenticity and architectural values, yet meeting modern requirements for energy efficiency and indoor air quality. ■

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# An Archaeological Approach to Reusing Industrial Past

## Archaeological Remains in the Frenckell Paper Factory Area in Tampere, Finland

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### Introduction

Industrial heritage is preserved in the form of landscapes and built heritage, as objects and archive material as well as non-material heritage. In Tampere, there are good examples of the reuse of well-preserved industrial buildings in a modern environment. Built heritage is seen as part of industrial history and nowadays it is also valued by citizens. Former factory buildings have both historical and use value in the city centre today.

There are, however, industrial heritage sites where factory buildings no longer exist. They have been demolished or have deteriorated, and all that remains of them are archaeological remains under the ground. Such remains and sites are part of the archaeological heritage. In Finland, they are protected by the Antiquities Act (295/1963). The archaeological context has particular features which differ from those connected to the built environment, and it also offers a particular problematic to the preservation and reuse of industrial past.



In this paper, we discuss a case study which concerns the evaluation and reuse of archaeological remains found in the Frenckell paper mill area. The remains are connected to the history of Finnish paper industry, to the period spanning from the end of the 19<sup>th</sup> century to the beginning of the 20<sup>th</sup> century. The former factory area is located on the western bank of the Tammerkoski rapids in the heart of Tampere City, and its position is significant both visually and in terms of the identity of



*The Frenckell paper mill was situated on the west bank of the Tammerkoski Rapids (to the left). The area in 1892 with the pulp mill to the left. © Gustin Lojander, Vapriikki Photo Archives.*

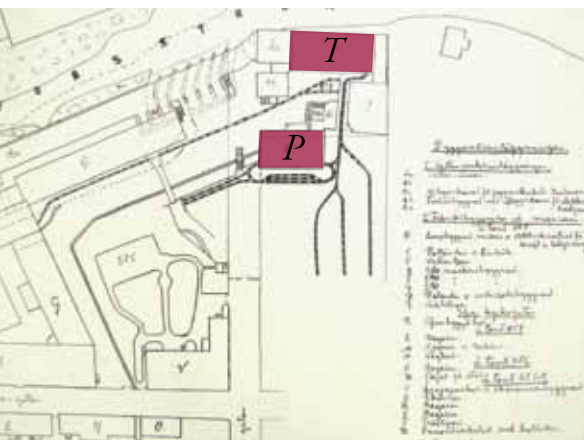
Tampere. The main factory buildings are in modern reuse as city offices. The area has been archaeologically surveyed and partly excavated since 2008. The archaeological remains in the former factory area present an interesting evaluation issue and problem in the reuse of archaeological sites.

### **Archaeological field works in the paper factory area**

The west bank of the Tammerkoski rapids is the site of the medieval village of Koski, an old market place and the Tammerkoski manor, which had its roots in the village. Tampere was founded in 1779 on the grounds of the Tammerkoski manor to support and promote industrial activity in the area. In the following decades, the banks of the rapids were gradually built up with mills and workshops. The first proper manufacturing plant in the Tam-

merkoski area – the paper mill – was founded in 1783, and was later known as the Frenckell paper mill. In the early period, paper was produced from rags, and later on straw was also experimented with as a raw material. The Frenckell paper mill had the first paper machine in Finland.

In the mid-19<sup>th</sup> century, the paper producing process was radically changed by the introduction of pulp as raw material. From that moment large amounts of timber were needed in the factory. In the Frenckell paper factory, a pulp grinding mill was built in 1877 by the Tammerkoski rapids. The timber yard was paved with heavy cobble stones, and a small industrial railway was built at the beginning of the 1900s to connect the timber yard to the power house and the pulp factory. However, in the 1920s production in Tampere was wound up and the factory premises were



*Plan of the Frenckell paper mill area in 1916. In the middle the timber yard with the railway which connected the yard to power house (P= Ångpannshus in the legend) and the pulp mill (T= Träsliperi). When the factory was closed, the area was sold to the city and the pulp mill was demolished and the yard covered with earth. The factory premises were partly changed into a park. © Tampere City archives.*



*Archaeological trial excavation in 2010.  
© Kalle Luoto, Pirkanmaa Provincial Museum.*

closed in 1929. The estate with its former factory buildings was sold to the municipality of Tampere. The pulp factory was demolished in the early 1930s. The stone-paved timber yard and the site of the pulp factory became part of a public park. The remains of the pulp factory foundations and timber yard were largely preserved under the ground, and today they are protected by the Antiquities Act.

In 2008 the City of Tampere presented a

plan of the renovation of the park. Among other things, the plan included new pipelines and a drainage system, and a new performance stage in the middle of the park. The excavators were allowed to dig in the area only under archaeological supervision. Archaeological surveys and trial and rescue excavations were carried out by the Pirkanmaa Provincial Museum. The field work was conducted by archaeologists Kalle Luoto, MA, and Sami Raninen, MA.

### **The value of the archaeological remains**

In Finland, the National Board of Antiquities has issued definitions and guidelines for the protection of historical monuments and sites. The definitions and the principles of protection are based on the Antiquities Act. For example, paper mill remains dating from the late 18<sup>th</sup> century and even from the early 20<sup>th</sup> century can be protected by the Act when the remains are connected to a significant part of the production process or are otherwise importantly linked to it.

The Frenckell pulp mill foundations have been preserved on the western bank of the Tammerkoski rapids. Stone and brick constructions have been found during the supervision work. The timber yard is situated on higher ground in the middle of the park. It



*The foundation of the pulp mill during archaeological supervision in 2010. The remains consist of floor constructions built with heavy stone blocks, bricks and concrete. The squares mark the position of machinery.*

© Sami Raninen, Pirkanmaa Provincial Museum.

consists of a large area of cobblestone pavements and the remains of a narrow gauge railway system. The railway connected the timber yard with the powerhouse, the pulp mill and the rest of the factory. The remains form a complex and historically valuable entity.

The archaeological site is connected to the history of paper industry in Finland, and particularly to the foundation of Tampere. The remains preserve information about the paper factory in a special way. It is different compared to the preserved factory buildings in modern reuse. The remains are the only original and preserved relics of innovative pulp technology in Tampere. The railway has also been preserved in a very authentic state. The pulp mill ruins are the only archaeologically documented remains of early pulp technology in Finland to have been discovered so far. Early pulp mills have mostly been demolished

or they are heavily rebuilt.

The remains add a new enriching layer to the historical value represented by built heritage. The pulp factory was not only an innovative production building, it was also visually very dominant along the Tammerkoski rapids. The remains have both visible and invisible features, representing both tangible and intangible heritage. They visualise how the yard looked when it was in industrial use. They preserve information about factory construction techniques, innovative production processes, the transport of timber and logs, the logistics system and masonry work. The physical remains provide a link between modern Tampere and the original factory with its management, workers and production. They also express the development and growth of the factory, add significant pieces to industrial heritage and help us create a comprehensive picture of the factory.

The original aim of founding a new town in 1779 was to promote industry. The Frenckell paper factory goes back to the first paper mill established soon after the founding of the town. The first modest paper mill began operating in an area which was included already in the first town plan. The recently excavated remains are the only remains which are still in the same condition they were soon after paper production ceased in the factory. They are authentic, and together with the historical power house and the main factory form an exceptional entity in the area.



The remains are visible signs of the collective memory of the City of Tampere. The fact that they are in ruins and have been covered with earth for a long time is also characteristic to them. As archaeological remains, they are partly fragmented and fairly young.

### **The protection process and problems of reuse**

The plans for the construction of the park have been discussed ever since the remains were found and were given the status of a protected archaeological monument. One issue has been how to cover the pulp mill remains and mark the site on the earth level. A more severe protection conflict has emerged concerning the cobblestones and rails in the timber yard, where a new performance stage

*The timber yard during the trial excavation in 2010. In the background is the power house which is both functionally and visually connected to the stone pavements and railway.*

*Below: A detail of the constructions of the timber yard. © Kalle Luoto, Pirkanmaa Provincial Museum.*



was being planned. One of the main issues has been how to preserve and present the remains in a way that maintains and supports their historical value. After documentation, the pulp mill remains were covered with earth and parts of it marked on the surface. Large parts of the cobblestone pavement have been uncovered and documented. It is possible that the historical timber yard will also be covered with earth. If the remains of the former factory yard were to be left uncovered, however it would enrich the park and the entire Tammerkoski national landscape.

A conflict may arise when heritage protection and land use planning are on severely different lines. In this case, scientific information was collected about the remains, the values were defined and compared to other industrial sites, the land use plan was assessed and finally priorities were defined. When valuable historical layers exist in a place where modern land use has been planned, a choice has to be made. While the Antiquities Act provides principles and guidelines, protection practises are created individually in each case. In this particular case, part of the timber yard constructions are preserved and plans for the performance stage must be altered, which has led to a protection conflict.

Archaeological remains of industrial heritage have not been researched scientifically as much as other types of sites and monuments in Finland. The archaeological aspect of industrial heritage is not known well enough, and industrial heritage is mainly conceived of as factory buildings. Historical monuments and sites have in general not been protected as well as prehistoric sites, even though the practices have been changing during the last decade. So far there are only few well-managed examples of the preservation of indus-

trial archaeological remains in Finland.

Action in the case of the reuse of the Frenckell site is based on historical values and features. Here the concept of reuse must be understood in a broad sense. The remains are protected by law and preserved as a historical monument. For example, the timber yard with its cobblestones and traces of rails could be reused by integrating it into the present events square. The performance stage could be built on the same earth level as the stone construction next to it and instead of hiding the old yard under a layer of earth it could be made accessible to pedestrians. The pulp mill foundation could also provide an interesting perspective on industrial heritage and a different way to visualise the past in the national landscape. If the site is left uncovered, conservation, management and maintenance need to be defined in the plans in greater detail. Any damage to the site must also be avoided. Foreign examples of similar cases should be explored.

In this case, the archaeological site definitely has a use value, which is connected with the citizens' collective memory. With good planning, the site may become an interesting and special focal point in the Tammerkoski national landscape. It should be integrated into the modern park and its facilities in a way which shows respect to the industrial heritage. The educational possibilities are many both as regards the pulp mill and the timber yard. Modern technology can be used to present the old paper factory area. Presentation materials such as a 3D model or tables of information are fine, but in this case the original constructions should also be presented in a proper way. ■

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# The Reuse of Large-scale Industrial Areas

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As we know, lots of industrial establishments have been abandoned or transformed for new purposes in the old industrial world in recent decades. Industrial companies still in business have simultaneously changed their production and marketing. The discontinuation and renewal of industrial production were particularly marked after the deep economic crisis at the beginning of the 1990s but has continued since then. However, the history of transformation goes back to the middle of the 1970s.

Sweden came out of the deep international recession of the seventies with many abandoned factories within old and mature trades of industry, such as iron and steel, shipbuilding and forest industry. Old industrial companies went into bankruptcy, others were merged and new ones established with owners investing in modern and efficient technology and buildings.

The widespread renewal of production and communication did not, however, start until the mid-1980s, and it accelerated in connection with the next deep international crisis in the beginning of the 1990s. The industrial society was then superseded by a global network society based on rapid flows of goods, information, knowledge and capital.



At the same time it is important to underline that the production of goods has by no means come to an end, although today it takes place according to other rules and in other forms than during the 20<sup>th</sup> century.

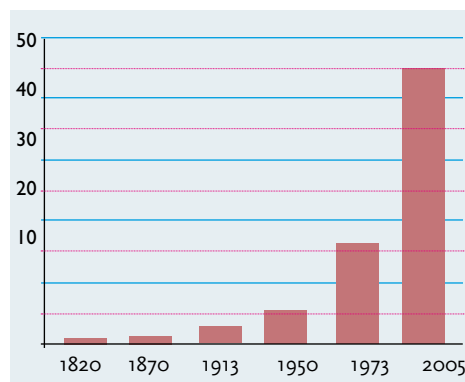
The mass production of components and final products is transferred from countries with high costs for labour, land and buildings to economically less developed countries with high economic growth, such as China and India. A shrinking group of people in the old industrial countries in the West is still engaged in the production of goods, if not directly, then in transportation and administration or in commercial and technical positions. Tasks have been outsourced from industrial companies. An increasing part of both white- and blue-collar workers

are, formally, freestanding from the factories, working in sub-contracting firms performing special assignments for the highly specialized industrial companies. For these companies, the trademark is an important asset. Yet they often keep construction and marketing, and sometimes even the production, of strategic high-tech components or of the final products under their “own roof” in the West.

The third industrial revolution is a useful concept describing this ongoing renewal of production in the old industrial world. The word revolution implies that it is a thorough process which changes not only working conditions, but the whole society. Decisive for this transformation is communication technology, the new ways to transport goods, people and information. Computers and the Internet were crucial for the transformation, but also container technology which from the 1970s onwards has revolutionized global trade. Words like flexibility, lean production, just-in time and downsizing are governing concepts for post-modern global industrial production. The old stiff system of production has been replaced by a more flexible one. A new global capitalism has emerged after the deregulation of the financial market from the beginning of the 1970s.

### The high-industrialized period

This transformation brings up problems that have to be handled. One concerns closed industrial areas, especially large ones. This type of area is a result of economic growth and the ideal for production during the high industrial period (1935–1985 in Sweden). During this period, the manufacturing sector was preferably based on mass production in large-scale units and huge open buildings. Economic growth and prosperity were con-



*Diagram of world production 1820–2005.  
From: Lennart Schön, Vår världens ekonomiska historia.  
Den industriella tiden. Stockholm 2010.*

sidered dependent on companies with hundreds or thousands of employees.

The large scale was closely connected with planning and bureaucratization, formal rules of procedure and abstract trust. The architecture of factories should be rational and efficient, that is “functional, constructive, additive, hygienic and anonymous” (Brunnström 1990:220). Industrial buildings dominated the skyline in many towns, people moved in from the countryside and the number of gainfully employed people increased.

The large scale soon became also an ideal in other areas of society – consumption, transportation, construction, agriculture, health care and education. Customers were to buy their goods in a rational manner in supermarkets, live in large housing areas and, when they became ill, visit large efficient hospitals. This was considered rational and good.

Ever since the economic crisis in the mid-1970s, the difficult question in old industrial districts has been: what to do with these abandoned large-scale industrial areas and all their buildings?

### Three phases in the first wave of closure

During the first phase of closures, local politicians and the trade unions in Bergslagen, an old iron and steel district in central Sweden, as well as in other provinces with heavy industry, tried to induce other industrial companies to establish similar production (for men) in the empty premises. They also turned to the Government for financial support for new establishments. However, they did not have

*Norberg with the large hoisting tower and the old church in the centre of the mining village is located in the county of Västmanland. The tower was built in 1960 and closed in 1981. The preservation of the tower generated a tough conflict in the municipality between those who wanted to demolish it and those who wanted preserve it as a historical monument. The latter won. Today the tower is used as an arena for music and theatre festivals. © Jonas Palm.*



*Innovatum is a museum and an education and development center in Nohab's former large industrial area in Trollhättan, Sweden. © Anna Storm.*

coherent plans on how the old industrial areas ought to be developed in the long run. New companies came (often because of the economic subsidies) and soon moved to other regions. They left after them large damages to the buildings and a strengthened feeling of frustration in the local communities with their decreasing and aging populations. This was a time when rescue was expected to come from outside, from the State and the big industrial companies. The standardized large-scale industrial solution was still the ideal.

In the 1980s, the (new) owners of the areas/buildings and the local politicians began to get more offensive. Municipalities and county boards relied on their own financial capacity and contacts with investors and developed plans for the abandoned industrial areas. The policy during the first wave had not given many positive or permanent results. The new non-socialist Government (1976-1982) also declared that the municipalities and counties had to rely on their own resources and act more aggressively in local industrial societies. After returning to power in 1982 the Social

Democratic Party continued this policy.

In the 1980s, local actors often took a broader view of large-scale industrial areas. They looked at the areas holistically, investigated thoroughly their character and used the knowledge as an asset in the process of regeneration. Instead of selling or letting out smaller parts, corporate parks were established with buildings designated for production, service and leisure. Shopping malls and sport centres were established in empty halls, together with cafés and lunchrooms. The new tenants could use the common facilities for their own purposes. Among those involved in the renewal process there was a growing interest in the history of the areas, but the history was seldom vital for the decision regarding the future of the site. The public was, however, partly included, especially if there were strong and active “dig-where-you-stand-groups” (Lindqvist 1978). Social history was investigated and narrated by local inhabitants and shown in exhibitions, but the areas were usually seen as parks for different types of economic activities, with the production of goods being the main purpose.

A third phase began in the mid-1990s. Industrial history with its focus on products, technology, architecture, architects, the founders and the managers of companies, these had now become important assets. Social history, on the other hand, was played down. Interpretations in publications and exhibitions became more abstract, with the architectural qualities and technology in the forefront. The grounds were cleaned and opened to the public. The oldest buildings were preserved. Buildings of “lesser historical value” and fences were removed. Cultural centres, museums, restaurants, shopping malls, schools, offices moved in to the areas. With funding partly from the EU (in Sweden from 1995), new activities were organized such as cultural events, ambitious educational programs and bold ventures involving high tech and services.

The ideals and solutions have changed even more since the 1990s. The spectrum of possible solutions has increased. In Sweden as elsewhere – this is by and large an international trend – there are today a lot of possibilities for the reuse – or misuse – of large

*A part of the industrial landscape  
in Norrköping (the former textile industrial area).  
© Maths Isacson.*



industrial areas. I will here discuss those I have recognized.

## **Nine possibilities**

### ***1. Continuity***

New industrial companies continue operating in one part of the area while the owner rents out some of the empty buildings, uses them as warehouses, or just leaves them without any purpose. This was, as we have just seen, a common solution in the first and second phases of transition after the crisis in the late 1970s, but it is still a possibility.

### ***2. Industrial hotels***

Instead of one new company engaged in nearly the same kind of production, factory premises owned by a public real-estate company are taken over by a couple of smaller companies with diversified production and services.

### ***3. Arenas for various service and cultural activities***

In the 1990s, municipalities and building companies started to transform large industrial areas by demolishing younger buildings that were not in a very good shape, repairing and cleaning them and putting in new objects (lamps, benches etc), planting trees and saw grass outdoors.

Into the renovated areas moved museums, art galleries, theaters, schools, science centers, restaurants, cafés and small service and production companies, artists and fitness gyms.

### ***4. Modern dwellings***

The transformation of industrial premises into modern dwellings has been problematic because of pollution, large interior volumes, inside passages, pipelines, large windows, poor isolation etc. It is often costly to transform production buildings into apartments. Over the last decades, building companies

have developed their methods with good results. It is especially popular to transform industrial buildings and warehouses at the waterfront in growing cities into luxurious modern dwellings.

### ***5. Hotels and restaurants***

Separate factory buildings, often in a nice and spectacular location, have been refurbished into hotels or nice restaurants. It is an advantage if the buildings are located at the waterfront. This is common in cities but also in other places with a potential for tourism and leisure activities.

### ***6. Universities and schools in city centers***

This is a good alternative because of the large interior volume of industrial premises which can be transformed into lecture halls of different sizes. Such university campuses, as the one in Norrköping, are appreciated by teachers and students alike because they are situated in the center of the city and have nice architecture.

### ***7. Exhibitions, music halls and shopping malls***

The large volume of closed industrial sites also allows them to be reused as exhibition halls or for shopping or other activities that require lots of space. This is common both in cities and in the outskirts of towns where no other possible use for large buildings is viable. In Sweden there are companies specializing in the refurbishment of industrial buildings into shopping malls.

### ***8. Abandoned places***

The most common future for larger industrial sites outside densely populated regions is to be abandoned and left without any planned use at all. Sites like these have become popular among urban explorers, especially if the areas and buildings are very difficult and dangerous to enter. Disrepair attracts. The visitors take

photos which they put on the Internet and they write about their visits in Facebook. In Sweden abandoned places have recently been exposed in two acclaimed photo books written by an economic historian, books that have reached a large audience (Jörnmark 2007 and 2008).

### **9. Demolishing**

Countless solitary industrial buildings and whole industrial areas have of course also been demolished. There are many reasons for this: they are in poor condition, dangerous to visit and very costly to repair. There is no demand for the buildings, and the owners do not want them occupied or turned into a museum, maybe projecting a disadvantageous image of the company.

### **Why have some areas been preserved and renewed and others not?**

The reuse of large abandoned industrial areas – the process, the actors, the problems and the outcomes – has since the beginning of the 1990s been investigated by researchers, discussed among cultural heritage authorities and politicians, and it has been the subject of many courses and conferences. Different aspects of reuse have been examined. I will here point out some possible factors that have had, still have and may in the future determine the fate of large-scale abandoned industrial areas.

The factors can be divided into those which have mainly reference to decisions, actions and events in the past, and those which have reference primarily to circumstances in the present and to the prospects of local communities. Furthermore, the factors can be divided into material and immaterial ones: those which are physically present in the landscape, and those which are present in personal memories, collective narratives, values and norms.

### **Factors with reference to *the past* are:**

#### **A:**

**a)** the importance of the industrial area for the local community and for general living conditions,

**b)** the technology, its scale, complexity and systemic character,

**c)** the impact of production on the landscape and the environment,

**d)** the owners and the workforce; whether they were natives and rooted in the local society or had a more loose local relation; whether the workforce was homogeneous or heterogeneous according to age, gender, class and ethnicity,

**e)** the mobilization of the employees; whether they were organized in unions and political parties and took an active role in the struggle for better working conditions and in local politics (the tradition of civic activism),

**f)** the economic and political importance of the industrial area at the regional and national level, that is, the symbolic value of the area in a broader context,

**g)** the closing down of the industrial area, the time (many years ago or more recently), whether this was a quick process or took place over a longer period, whether it was total or partial, and also the circumstances surrounding the shutdown (how people remember this period of de-industrialization).

### **Important factors with reference to *the present and future* are:**

#### **B:**

**a)** the ownership of the industrial area (owned by the municipality, an anonymous foundation, a construction company or an industrial company),

**b)** the physical character and quality of the area (the degree of deconstruction; what is left and what has been removed or destroyed;

the degree of pollution and the cost of cleaning up the area, the quality of the building materials),

**c)** the location of the area regionally (at the outskirts or in the centre) and nationally (in a densely populated region with economic growth or in a depopulated area in economic decline),

**d)** the demand for large-scale premises for different purposes (see also B: c),

**e)** the demand for land for new purposes such as dwellings, shops, recreation or tourism (connected to B: c),

**f)** the role of the area for local identity; whether the area, either entirely or some elements of it, is/are an important symbol/symbols (connected to A: d-e) ,

**g)** the various interpretations of the area within the local community and among different groups (according to gender, class, age and ethnicity). How important are the narratives for local identity?

**h)** the position of the area in the regional and national context (see A: f),

**i)** the laws and regulations concerning the reuse of old polluted industrial areas,

**j)** the cost of demolition and preparation of the new use, and the access to capital to finance the reuse project,

**k)** the process of globalization and how it influences the region and the industrial area in question.

Some of these factors are internal, closely connected to the industrial area and the local community, while others are external, connected to actors, regulations and processes outside the local community. Some factors in A are closely related to B, and vice versa. All factors are not equally important, some are more important than others.

Of great importance today is the globalization of the economy and the relocation of production to countries and regions which can offer land, buildings, infrastructure and labour at competitive prices. This is why the relative cost of labour and land (in comparison with other regions) has become more and more critical for the outcome of industrial production in the old industrial world, and for the fate of closed-down areas. In the European Union, regional subsidies also constitute a strategic factor because they can provide resources for alternative reuse in backward areas. But which factors are especially important, besides localization and economy, for the contemporary reuse of abandoned industrial areas?

The contemporary actors and their interpretations, visions, and economic and political strength are crucial. The outcome is largely determined by those who have the power to present the most reliable vision and are able to drive through a programme for the future use of the area, and can mobilize money for the renewal. This requires, however, a sense of the existing interpretations and narratives of the area, as well as what things can support be secured for to finance the transformation. All these are changeable over time. In the beginning of the 1990s the focus was on technology, working conditions and trade union activities. In the end of the decade the interest shifted to the architecture, the owners and managers, and to specific products or events. During the first decade of the new millennium the interest turned to more abstract and mythological interpretations, which are suitable for spectacular events and tourism. In the near future, it will become even more important, at least in depopulated areas, to provide titillating and risky adventures than to tell the history of labour and social conditions. ■

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# Sustainable Industrial Heritage: Reuse Models and Concepts

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## Introduction

In the current age of environmental consciousness, demolition of industrial buildings and sites can no longer be justified. The conservation of these buildings and the re-qualification of the surroundings can only be guaranteed by appropriate reuse. The reuse of industrial buildings has become economically feasible, due to their flexibility, adaptability and multi-functionality.

The aim of a reuse project is not only to analyse the current state of the art, but also to lay down a strategy for the future. According to the American Heritage Dictionary, reuse means “to use again, especially after salvaging or special treatment or processing.” This special treatment is often a transformation, “a marked change, as in appearance or character” (American Heritage Dictionary, 2009).

Reuse is a broad term that can be implemented in theory and practice within different perspectives – for example: the reuse of scale, the mode of reuse, the duration of reuse, the type of reuse, the location of reuse, the reuse of values.

## Value determination

The main question is: Which values and significances are so important that they must be implemented in the reuse strategy so as to preserve the values for future generations? The success of a reuse project depends on various criteria for the evaluation of industrial heritage. In Mason’s research report (2002), the planning methodology to assess heritage values is described as a part of an integrating conservation planning for reuse projects. Although value and significance assessment of the industrial heritage is temporal, values change over time and are shaped by contextual factors, determining the adaptability or mutability of the industrial building.

The reuse of industrial heritage sites is a multi-criteria decision problem which must be able to accommodate many criteria, including the historical, cultural, social, economic, technological, as well as sustainable perspectives. Multiple criteria analysis is a method which enhances the chance for success (Voogd, 1983). It provides a systematic framework, a tool, for evaluating a list of

objectives. It also evaluates the less tangible elements and helps designers and stakeholders make good decisions. A disadvantage of multi-criteria analysis is the subjective assessment of effects.

### **Case studies: the Wiels brewery in Brussels and the Lamot brewery in Mechelen, Belgium**

I will discuss the Wiels brewery in Brussels, reused as an art centre, and the Lamot brewery in Mechelen, reused as a conference and heritage centre where culture and commercial activities are integrated, by means of models. These models describe the process of reuse and give insight on factors which determine the success or failure of the renewal and improve sustainable performance.

The Wiels brewery in Brussels and the Lamot brewery in Mechelen are exceptional witnesses to and representatives of concrete industrial buildings in Belgium. These remarkable and impressive examples of an industrial past have recently been reclaimed, restored and transformed. They can both be seen as being among the most impressive realisations of industrial reuse in Belgium. The reuse of these industrial buildings was successful and also crucial for the revitalization of the built environment. Due to our recent awareness of the importance of renewable energy, it is no longer acceptable to waste energy and capital by demolishing these sites. The reuse of these old and flexible industrial buildings has a high economic value because of their changeability and multi-functionality.

#### **The Wiels brewery in Brussels**

The industrial area of the Wielemans–Ceuppens brewery is located to the south of Brussels, in the periphery of the city centre of the



*The old Wielemans–Ceuppens brewery.*  
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*The Wiels brewery: reused as a contemporary art centre.* © [www.erf-goed.be](http://www.erf-goed.be)

capital of Belgium and Europe. The Wiels building, which is an exceptional example of modernist industrial architecture in Belgium, was designed by architect Adriaan Blomme in 1930 and is today an urban landmark (Blomme, 2004). For the technical aspects of the reuse project, the company Wielemans–Ceuppens turned to the Brussels-based engineer Sarrasin.

The architecture of this building features a modernistic lay-out, a construction of reinforced concrete, compact building volumes in white rendering, outspoken horizontalism through strip windows together with art-deco elements. The brewing room designed by Blomme is an example of the attitude of a time when the distance between production and the consumer was diminishing; this is expressed by a transparent and visible architecture. The room is unique both from a historical point of view and in terms of its architectural concept. In this monumental space, lit by twelve–meters high windows, three original brew-kettles are still present.

The first buildings of the Wielemans–Ceuppens brewery were erected in 1880. The site was chosen because of the inexpensive land and the presence of the Zenne river. With continuous expansion of the brewery, an extension was added in 1903, a building in the Art Nouveau style that comprised a machinery and brewery room. The famous brewery building by Blomme was built in 1930. By the end of the 20<sup>th</sup> century, the Wiels brewery lost its productiveness because of increases in scale, thus falling into total disuse. In 1980, the brewery was sold to Inbev. After more than one hundred years, at the end of September 1988, the last Wiels beer was brewed.

At first the importance of this heritage site

and the historical values of the machine room were denied. Four of the eight brewing kettles were dismantled. After that, the place became a contemporary ruin. In 2005, a selected design competition was launched, signalling the start of a revival of the building and its environment.

### **The Lamot brewery in Mechelen**

The reuse of the Lamot brewery in Mechelen is part of an interesting city renewal project. Located near the river Dijle, the Lamot brewery was one of the largest industrial sites in the old city centre of Mechelen, and played a prominent role in economic and social life. The extension of the brewery was an ongoing process, which led to a conglomeration of several buildings. The most important reason for disuse is of a demographic nature. In 1995, the brewery terminated its activities, because it was impossible to expand further.

The brewery is an identification point for the public and has an important identity value. Many local people worked there. The architecture of the brewery tells the story of the history of brewing in Mechelen over the last 367 years. Because the building was not protected as a monument, parts of the plant that were no longer adequate because of structural and aesthetic reasons, were demolished and replaced by new buildings. With the refurbishment, only a small part was preserved. The oldest part with the brewing kettles, approximately one eighth of the former complex, was in a relatively good condition and was kept intact. The reinforced concrete structure of the building, which is hidden by brick façades, was in a good condition. The concrete structure was kept intact on the ground floor, but the brick skin was removed and replaced by glass.

## Reuse models and concepts

Different models can be applied for the reuse of industrial heritage buildings. These models describe the process of reuse and provide insights into the factors that determine the success or failure of the renewal. Firstly, a good model reduces the complexity of the problems and helps to understand the phenomena. Better understanding will lead to better actions and give research a scientific underpinning. Secondly, models are used to refer to a desirable situation for the process of a reuse concept. Finally, reuse by means of models can be a very workable method for simulating future situations.

As methods for the architectural concept, the approaches of Cedric Price and Crimson Architectural Historians were evaluated.

The English architect Cedric Price (2003) describes six design methods that comprise the major approaches towards the transformation of existing buildings: reduction, addition, insertion, connection, demolition and expansion. Addition and insertion are the main intervention models in Wiels. The

*Interior of Lamot, conference and heritage centre.*

structure of the reinforced concrete building would have changed drastically, if one would have tried to insert accurate circulation into the volume. The decision to add a new construction that establishes circulation as a link between the brewing area and the silos, made it possible to preserve the listed building and conserve the characteristic volume. Only in the silo were extra floors inserted.

Reduction, demolition and addition were the main interventions for the design concept in Lamot. Reduction was used to add more daylight and a panoramic view. The building was torn open, as if after an internal explosion, dismantling the finishing of the walls and replacing them with structurally fireproof glass. Because the building was not protected as a monument, parts which were no longer adequate were demolished and replaced by new structures. The oldest part with the brewing kettles, approximately one eighth of the former complex, was kept intact. In addition to the façade at the riverside, a glass volume was added that functions as the main entrance hall and a large auditorium.

In their book *Re-Arch*, Crimson Architectural Historians distinguishes between





*The old Lamot brewery in Mechelen.*  
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*The Lamot brewery in Mechelen – reuse as a conference and heritage centre.*  
© Erfgoedcel Mechelen.

eight so-called rhetorical characters (Crimson 1995: 38-49). These characters can be used as a model for the designers point of view in confrontation with a historical industrial building. The concepts of palimpsest and recapitulation were applicable for both case studies. Palimpsest refers to a design concept which activates a competition between old and new. It adds a new layer to history by using the programme as a tool for transformation.

Recapitulation means returning to the design mentality of the original designer. The architects for the reuse projects of Wiels and Lamot added new interventions in a rational way, being as pragmatic as the Lamot brewers had been, with every new extension joined stuck to the existing building.

In the reuse concept for Wiels, we can also recognize the concept of recycling, with the old image giving meaning and an aura to the reuse. This might be because the brewery is a protected monument with interesting architecture and spectacular construction. In the design concept for the reuse of the Lamot building, we can clearly identify the concept of contrast. The largest part of the brewery is conserved and interwoven with a new structure in steel and glass. The old and new elements respect each other and give the entire complex an additional attraction.

### **The multiple streams model of John Kingdon**

The political economist John Kingdon (2002) describes a multiple streams model which embraces several factors and actors in the three 'streams' of problems, solutions and political events. All these streams influence politics and policy attention on a certain subject. When these three streams come together,



*Interior of the Wiels Centre for Contemporary Art.*  
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a positive climate arises to undertake initiatives. This leads to a flow of decisions, and a 'policy window' or a window of opportunity is opened.

For Wiels especially, a policy window was opened thanks to the interest and support of the famous international artist Luc Tuymans. In 2005, a design competition was launched, signalling the start of a revival of the building and its environment. For the Lamot site, a solution was found through the value determination which was formulated by the staff of the Monument Department of the City of Mechelen (Callens, Van den Mooter 2000). This research gave an insight to the potentials of the site. The value determination was visualized by using the metaphorical concept of a dollhouse. The idea of a dollhouse suggests the potential qualities of the building and preserves the special character and atmosphere of each room. In Mechelen, the elections led to a new political government that decided to launch a competition as the starting signal for this project.

## Strategies for success

Strategies are best formulated in general terms so that a specific interpretation for each individual reuse project is possible. "Where a plan is based on prediction, a strategy is designed to encompass unforeseeably changing conditions. A good strategy ensures that, no matter what happens, you always have maneuvering room." (Brand, 2005:178)

A phase model identifies the most likely strategy and enables the effective management of the often complex reuse process. The overall aspects of most phase models are similar. The RIBA Plan of Work describes the different steps of the reuse process. This model is widely used and comprises three phases (Phillips, 2008).

The first phase is to conduct a feasibility research. This was done for Wiels, but not for the reuse of the Lamot building. This is regrettable, because a number of buildings on the site were demolished even though they were in a good condition. The second phase is the preconstruction period, which includes the inventory and analysis of the potential uses and the value assessment of the exterior, the interior and the machinery. The introduction of a design definition and programme requirements eventually leads to the architectural concept. The determination of the sticking points for the construction decision must be in accordance with national and European legal requirements concerning fire safety, sustainability, accessibility and sound and heat insulation. The third phase is the preparation and implementation of actual construction work. For both projects this was possible due to the sponsorship of the Flemish government.

## Sustainability models

The reuse concept of neither brewery placed any special emphasis on sustainability. Within the existing building stock, particular industrial heritage has a specific socio-cultural and historical value and ensures cultural diversity. What strategy can we apply to meet sustainable objectives in the reuse of industrial heritage or monuments?

A comparison of several sustainable evaluation methods from different countries in search for the meaning of sustainability shows that a combination of the BREEAM and the DUMO models seems to provide the best frame for selecting the best sustainable strategy to be applied for the reuse of industrial heritage buildings and sites.

The DUMO model, developed by the Dutch Institute of Building Biology and Ecology at the behest of the institute of monument care, is the only sustainable tool that also takes cultural-historical values into account (Nusselder et al, 2008). On the one hand, the DUMO model distinguishes between sustainable topics such as materials, energy, water, interior climate; the model is based on the 'GreenCalc' tool for the calculation of these topics. On the other hand, cultural heritage criteria such as cultural historical aspects, minimal intervention, reversibility, appropriate use and adapted comfort requirements are adopted in the model.

This method is more realistic, because it takes into account changes in the use of the building and also its adaptation. Adaptation includes all transformations that aim to modify an existing building to meet contemporary requirements. It is only through adaptation that the long-term utility of a building can be prolonged. A low Mo coefficient means that

many interventions are possible, while a high Mo coefficient means that the mutability of the monument is smaller.

BREEAM is becoming an important international established standard within sustainability evaluation (Lousberg, 2009). BREEAM stands for Building Research Establishment. This assessment method sets standards for sustainability by labelling buildings on sustainable aspects. The building can earn credits on the following nine topics: management, energy, transport, water, materials, waste, land use and ecology, pollution, and health and well-being. What is interesting here is that health and well-being aspects related to interior comfort are also a part of the evaluation by BREEAM (BREEAM, 2004).

Along with environmental and cultural resources, such as buildings, artifacts and sites, also cultural memory and meaning have to be sustained. Sustainability holds great potential as a framing concept for the task of integrating heritage values.

## Conclusion

Preservation, conservation and management of industrial heritage evolves to a continuous re-interpretation of significances and values in both the present and the future world. A reuse strategy is about making good choices. Reuse strategies must be based first and foremost on the principle that industrial buildings must be reused in ways that are both appropriate and sustainable.

If we want industrial heritage to attain a peaceful co-existence with sustainability, we cannot rely on standard solutions, but have to assume the characterisations and the cultural values of the buildings themselves. Each monument requires an exceptional approach and treatment. ■

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# Emphasis on the Sublime of Industrial Heritage – the Best Way for Its Reuse?

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**We all sometimes feel doubtful when visiting a reused industrial site: how can we know it is a former industrial area? What is the appropriate way of transforming industrial surroundings?**

The conversion of industrial sites is influenced by social change, by new approaches, by the reinterpretations of scholars and professionals regarding preservation even in the course of short period. The past four decades which saw quite a lot of reuse of industrial sites enable us to discuss the history (or even the tradition) of conversions.

## **The first phase in the reuse of former industrial sites – promotion**

In this field, the British scholar and architect Michael Stratton made a precise study of possibilities to reuse industrial buildings. He classified industrial heritage buildings<sup>1</sup> according to their size, their inner spatial structure, and the convenience of their reuse. In his discussion of possibilities for the adaptive reuse of industrial buildings, he shows that industrial heritage is one of rare cases where



new functions can be adopted almost without any difficulty.<sup>2</sup>

The road to the promotion of industrial heritage as an attractive field for reuse was long and hard. Interest in the reuse of redundant industrial premises was increased by the actions of various local and international organizations on the conservation of industrial monuments, by their enlisting on the UNESCO World Heritage List, and by national engagement. Dwellings, schools, universities, art centres, museums as well as leisure activities are among the functions now located in former industrial sites. At the time, it was very important to ensure society at large that such reuse is possible (and even carries

greater merit than other types of built heritage) without getting into deep discussions on the necessity to retain the sites' identity, etc.

### **Entering the second phase**

We are now entering the second phase – reviewing what has been done and looking for new ways. The great diversity in the tradition of the reuse of industrial sites as well as their reinterpretation is shown by the Swedish scholar Anna Storm in her doctoral thesis *Hope and rust: Reinterpreting the industrial place in the late 20<sup>th</sup> century* (2008).<sup>3</sup> Her case studies proved that “the homogeneity of the phenomenon and the aspect of authenticity and uniqueness of individual places have mutually reinforced each other. An international frame of reference was used to strengthen the conception of the local industrial place both as truly unique, and as a prominent part of larger context.”<sup>4</sup>

The conversion of industrial places often becomes a fashion. This problem is well expressed by Wolfgang Ebert, who is anxious about the authenticity of the *Landschaftspark* (landscape park) in Duisburg-Nord: “the present fashion of using industrial sites as stages is dangerous, because it could soon be out of fashion and then suddenly nothing is left.”<sup>5</sup> I agree: being fashionable poses a great threat to an industrial area: developers like to use the term “industrial” even when there are no traces of industry left on the construction site, or when they put up a new building in which only the name, such as “Timber Wharf” for a multi-story dwelling house, makes it “industrial”.

### **The sublime in industrial built-up environments**

In order to avoid any misunderstanding or misuse of industrial objects, it is important to

discuss broadly the question of the authenticity (or identity) of industrial sites, and their buildings in particular. I have tried to find an answer to the question of the reuse of industrial environments through the subject of the sublime. In my opinion, the concept of the sublime could provide the key to the solution, because it stresses the importance of industry, but also leaves room for new – individual and creative – approaches in each case.

From the very beginning of industrial installations, the sublime has been present – large-scale buildings have always affected human senses. The Danish scholar David E. Nye has demonstrated the presence of the sublime in his book *American Technological Sublime*.<sup>6</sup> The same – although there are some differences – goes for Europe. Bad or good, these emotions do not give us reason to ignore this important part of modern society, of our life – the industrial issue.

Nye discusses several forms of sublime in this field: as presented by Immanuel Kant – dynamic and mathematical (which Nye transforms into geometrical); and as new forms – the industrial sublime and the electrical sublime in connection with railroads, bridges, skyscrapers, and factories. From these, he deduces several more forms of the sublime: the integrated sublime and the consumer's sublime. One crucial finding by him is that the sublime is present at industrial sites only at the beginning: “For Burke and Kant the sublime was a constant, but history has shown that it seeks new objects. Yesterday's technological wonder is today's banality.”<sup>7</sup>

### **The sublime as an aesthetic issue**

Still, Nye is more concerned with the social context of technology; also my point of view is aesthetics. I will therefore return to

Edmund Burke's<sup>8</sup> concept. Based as it is on psychological effects, it could be useful in current research. Burke suggested the sublime as an aesthetic quality which has the capacity to instil feelings of intense emotion and awe (it can act as *Catharsis*)<sup>9</sup>, ultimately creating a pleasurable experience.

Even if Burke dealt with the sublime of nature, a landscape; the attributes he displayed can be applied to the industrial built milieu, too. Thus, obscurity, contrast, power, darkness, vacuity, silence, vastness, magnitude, infinity, difficulty, magnificence, all these could be used in conversion to establish a bond with the past of the industrial site. Of course, this is suitable in cases where these attributes existed before the reuse.

We can identify them in industrial places: the massive size of the factory, its rhythmic repetition, its length that suggests the infinite, even the somber colours of the building might be a key issue when searching for a possible original design for its reuse. Blend to this local materials or even former products, adapted in a new way – it would be a real starting point for creating the individuality of a site.

Two groups of affects should be taken into account:

- impressions which arouse awe, and
- impressions which arouse admiration.

In the first case we are dealing with Kant's dynamic and mathematical sublime, in the second case we envisage new, never seen before things, or things which suggest the infinity of man's mind, his creativity, etc.

### The beauty of ugliness

It is very important to keep in mind that an object is necessarily not beautiful; it is also possible to talk about ugliness, e.g. the beauty of ugliness. It is like the uncanny – something



Former "Lindenau" shipyard (known as the Klaipeda Ship Repair Company in the Soviet period) in Klaipeda Lithuania. © A. Štelbienė

unusual which, according to Ernst Jensch<sup>10</sup>, causes "intellectual uncertainty" and which "we can't figure out".

The means mentioned above are quite common, and they could be used to describe other types of buildings as well. The question is, where lies the distinctiveness of the industrial built environment?

In *The Death of Light, III, 2* (1964) Hans Sedlmayr describes the awe caused by the beauty of ugliness of an industrial city: "The ugliness of most of the city's new neighbourhoods is indescribable: an ugliness that takes your breath away."<sup>11</sup> It is like acknowledging that besides beauty there must be ugliness – this dichotomy embodies the equilibrium, the harmony of the world. And this equilibrium is affordable in the reinterpretation of industrial sites.

Sedlmayr also represents the point of view of the common people – among whom it is popular to treat industrial architecture as "ugly", mostly because industry remains for the public "a stranger" (a place with no en-

trance). Thus, ugly is not only aesthetic, but also an ethical category in the case of industry.

This could be turned into an advantage – a positive slogan, “the beauty of ugliness”, could be used as a means in the conversion of industrial surroundings to prolong the connection of a built-up environment with its industrial past, instead of disconnecting it. Of course, this is just one of many means to achieve the aim of reuse – to retain the sublime of industry.

### Studied cases

In this article, I refer to seven reuse cases<sup>13</sup> which represent two groups: what I call “industrial disconnected” and “industrial prolonged”. Some of the cases are clearly representative of either the first or the second group, others have just some features which interrupt the solid picture of the site as a whole.

The focus of this paper is on differences in the design of these conversions. Design is indicative not only of the capability of architects to deal with industrial surroundings, but also of their attitude, and the attitude of their clients, i.e. of the public who are going to live in, to use the site. It is always matter of interpretation.

Depending on what designers focus on, two ways of treating industrial heritage can be traced.

- The first is to turn it into a “cosy” milieu to live in – the authors of the conversion try to make the former industrial area resemble as closely as possible a residential area all are familiar with. This is what I call “industrial disconnected”.
- The other way of interpreting the heritage is to pay attention to the past of the industrial site, to its character, aiming to capture the “spirit” of the industrial environment.

Such conversions I call “industrial prolonged”.

Thus, Teknikbyn, or Västerås Technology Park, in the former lush industrial estate of Kopparlunden (Sweden), the Helsingborg campus of Lund University (Sweden), the former Lindenau shipyard (known as the Klaipeda Ship Repair Company during the Soviet period) in Klaipeda (Lithuania) – these would belong to the “industrial disconnected” group.

Meanwhile, the area of the former Kopparlunden steel factory in Avesta (Sweden), the Mälardalen University in Eskilstuna (Sweden), the centre of Norrköping (Sweden), the Sulzer redevelopment in Winterthur (Switzerland) could all be qualified as attempts to prolong the existence of the industrial identity of a site.

In the “industrial disconnected” cases, the reused industrial environment differs little from the cases of the adaptive reuse of other types of buildings (such as former cinemas, office buildings, etc.). For example, the former rubber factory in the South Harbour of Helsingborg was converted into a campus of the Lund University. Although modern engineering technologies were used for the conversion, they are not exposed so as to seem part of its aesthetics or to be associated with the past of a factory. The attractive freshly built attic, clad with metal sheeting, as well as the main façade painted in bright colours (originally it was red brick walls) give a small hint on the origins of a house.

Similar changes were made in the Kopparlunden Technology Park (Teknikbyn) in Västerås, Sweden, where not just the inner structure was modified into unrecognisability, but even decorative painting was used on the walls. Of course, in some cases entrepreneurs

display a wish to create a more futuristic look for the interiors – in order to help personnel be “productive and innovative”. As they declare in a promotional *Teknikbyn* leaflet:<sup>14</sup> “An intriguing contrast is created by the historic exterior of the buildings, and their light, futuristic interiors.” While this is mostly just a matter of simple, clean, and bright finishing of the walls, the alteration of the character of the inner spaces of the workshops is a bigger loss.

The grounds of the Kopparlunden Technology Park are also decorated with geometric parterres with planted trees. If we were to compare its urban landscape with regular public spaces, we would realize it is not so different: the usual pavement for pedestrians, ordinary benches, and usual parterres. Instead of highlighting the identity of the area as a former industrial site, this blurs its connection to the industrial past.

Similar miscodification of former industrial surroundings can be seen in Klaipėda. The site, which was the Lindenau shipyard at the very beginning of the 20th century and functioned as a ship repair company in the Soviet era, was recently transformed into a public-commercial site with a yacht club, several hotels, an office building, and a big public square. Although individual industrial buildings still remain, their future is unclear as they have not been renovated, and no new use has yet been found for them. New build quays with simple benches, ordinary pedestrian pavements – all these impart a fresh look to the site, but avoid referencing the industrial past.

The new added parts are in the high-tech style – an approach used quite often in the conversion of industrial buildings. One example is the conversion of a former metal



*Campus Helsingborg of the Lund University Sweden. © A. Štelbienė*



*“Teknikbyn”, Västerås Technology Park in the former lush industrial estate of Kopparlunden Sweden.*

© A. Štelbienė

and machine factory in Eskilstuna into the Mälardalen University. Here the new designed elements in both the interior and the exterior bear an industrial character: the steel used for stairs and handrails, heavy sliding doors with large rails in the high-tech style, steel beams, and visible ventilation ducts re-

mind the visitors of the industrial past of the building. Not as noticeable, but very important, is the way separate rooms are established without dead walls: wherever it was possible, the required rooms were set in a gallery, thus preserving the space as a whole. Also, the difference between the original structure and the new one is clearly noticeable as the design of the latter is modern, with light construction and wide windows. All these “reminders” of the building’s past demonstrate a clear attempt to retain the image<sup>15</sup> of a factory.

The use of original industrial products or materials in a new manner is seen in Koppardalen area in Avesta: rusted steel boxes are turned into parterres, gravel is used for paving. In one example, a square built in what used to be a factory shop is paved with gravel made from smashed slag. In this way the architects of the reuse project establish a clear distinction between ordinary places in the city and the former industrial area.

An even more vital urban structure found a place in Norrköping – a pedestrian bridge alongside the building of an art school (now closed), hanging alongside the Motala river

*The former Koppardalen steel factory area in Avesta Sweden. © A. Štelbieniė*

(originally there was no path from that side of the buildings). The design of the bridge is rather original: it is made of huge pipe, one half of which was sawn off; metal lattices serve as flooring, and wooden boxes are used instead of benches. This way of using industrial products for a new purpose could be seen as an attempt to stress the image of the site’s industrial past through the use of rough production materials.

A very delicate conversion is apparent in the former Sulzer industrial area, specializing in the manufacture of industrial machinery and equipment. It was founded in 1834 in Winterthur, Switzerland. This case proves the importance of the client’s awareness: the Sulzer company decided to move its production from the historical site, but they kept it for conversion. Since they were proud of their rich historical past, Sulzer was keen to preserve the area, although some buildings were demolished. An area of more than 20 hectares in size was reused for a mix of functions: public, housing, offices, as well as restaurants, supermarkets, etc.

Architects B. Nipkow and W. Vetsch created many interesting solutions: pavements made of gravel and ironstone, a trough for



rain water that looks like a rail, artificial ponds that look like natural pools after rain, and even greenery is introduced in the industrial setting in a new way: all trees are “planted” into a concrete platform. Instead of the usual benches, chained chairs stand in a square. All this establishes fragile, but very suggestive connections to the industrial past of the site. One might even say that the rusty parts of the pavements and design elements also allude to “unfinished and always wanton”.

How is the beauty of ugliness employed in the “industrial prolonged” cases mentioned above? It can mostly be seen in the use (direct and indirect) of such attributes as dark colours, contrasts (rustic vs. smooth surfaces, rough vs. shining details, etc.), infinity (retaining the original volumes of structures, the size of the inner spaces, the “endless” repetition of windows), obscurity (aging surfaces as an image of a “dirty” industrial environment), etc. Overall, the architects proved that the beauty of ugliness could and should be treated not as an opposite of beauty, but as a source of inspiration.

## Conclusion

The question may nevertheless arise: how can the means mentioned above (the beauty of ugliness) be linked with the sublime of industrial surroundings? Especially if – according to Nye – the industrial sublime is a passing phenomenon.

According to Longinus, the mark of a truly sublime object is that it grows in significance with repetition, e.g. a reused industrial site should not lose its original magnificence and present visitors with new emotions every time they visit the site. According to the present article, the feature that distinguishes industrial design from other art forms lies not in its beauty,



*Interior of the Mälardalen University in Eskilstuna Sweden. © A. Štelbienė*



*The former “Sulzer” industrial area, Switzerland. © Ralph Feiner*

but in its ugliness. It is the beauty of ugliness which makes industrial surroundings idiosyncratic. Yet while researchers agree that a commodity (a reinterpreted industrial site) can be created on the basis of a fascination for danger and misery, it cannot afford to be unpleasant<sup>16</sup>: it is a mistake to reuse an industrial setting by adding to it “commonplace” artefacts. ■

- <sup>1</sup> Stratton, Michael. "Understanding the potential: location, configuration and conversation options", in: *Industrial Buildings: Conservation and Regeneration*, ed. M. Stratton. E&FN SPON, London: 2000. p. 30-46.
- <sup>2</sup> Michael Stratton pointed out such possible functions as commercial adaptive reuse, a new type of industry, housing, offices, mixed use, cultural use, monument. To this I would add entertainment use, which has become more and more popular over the last decade.
- <sup>3</sup> Storm, Anna. *Hope and Rust: Reinterpreting the industrial place in the late 20th century*. KTH, Stockholm, Sweden, 2008, p. 214.
- <sup>4</sup> Storm, A., p. 166.
- <sup>5</sup> Storm, A., p. 137.
- <sup>6</sup> Nye, David E. *American Technological Sublime*. Cambridge, MIT Press, 1994, 354 pp. [review in *Boston Globe*, Oct., 1994; *Nature*, April 13, 1995]. Paperback, 1996.
- <sup>7</sup> Nye, D. E., p. 237
- <sup>8</sup> Burke, Edmund. *A Philosophical Enquiry into the Origin of Our Ideas of the Sublime and Beautiful*. Oxford University Press, 1990.
- <sup>9</sup> Catharsis or katharsis (Ancient Greek: κάθαρσις) is a Greek word meaning 'cleansing' or 'purging'. It is derived from the verb καθαίρειν, kathairein, 'to purify, purge,' and it is related to the adjective καθαρός, katharos, "pure or clean." Using the term "catharsis" to refer to the emotions was first done by the Greek philosopher Aristotle in his *Poetics*.
- <sup>10</sup> Eco, Umberto, ed. *On Ugliness*. Rizzoli International Publications, Inc. 2007.
- <sup>11</sup> Eco, U., p. 340.
- <sup>12</sup> Of course, one needs to keep in mind all the diversity of the interpretation of this slogan ('beauty of ugliness'); nevertheless this diversity of interpretations is well represented in the book *On Ugliness* by Umberto Eco.
- <sup>13</sup> Mostly sites, visited together with STINT group in period of 2001-2005, also – within the platform IHP.
- <sup>14</sup> TEKNIKBYN: Västerås Technology Park. THP Producentreklam/ Westerås MediaTryck. P. 27. [www.teknikbyn.org](http://www.teknikbyn.org)
- <sup>15</sup> In this article, I use the term "image" in a philosophical, marketing sense: it is like a "brand image" which helps people construct the perception of an object with its distinct features, e.g. values.
- <sup>16</sup> Storm, A. p. 167.

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# Cotton Mill Cities and Power Canals in Scotland, America, Finland and Estonia

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Cities created to spin cotton by water power share a common morphology. Tampere, industrialised thanks to Scots-born James Finlayson, is one of the best examples of a post-industrial city that uses its built assets around a water system. Narva/Ivangorod is another formerly Russian city, where the Kreenholm cotton mills still function as the largest mills in Europe. Parallel power canals there show a startling similarity to cities created at waterfalls in North America. The most famous is Lowell, but there also are Lawrence, Manchester, Nashua, Troy, Lewiston and Saco/Biddeford. Each has a series of mills running parallel to power canals taken from falls in large rivers. The rehabilitation of mills in some of these places will be discussed, showing where historical value has been accentuated by conversion, giving communities a sense of place and purpose. Selection was driven by fieldwork, as surviving urban cityscape gives a geographical impetus to historic research.

The layouts of the cities most likely responded to functional need, but there may be some influence from the earliest known



of the type in Scotland. The spinning mills at New Lanark started in 1785 parallel to a power canal fed by a waterfall. Other Scottish cotton mill villages – Catrine, Stanley, Deans-ton – began at the same time with the help of Richard Arkwright. A common set of values stretch between these places and the cities later created in the then wildernesses of America and Russia.<sup>1</sup>

**An industrial colony** is a company town created by a single enterprise and run in such a way as to attract, retain and control the workforce. Parallel terms might be *bruk* in Swedish and *cite ouvrière* in French, but I will

use colony, from the Latin and Spanish use of the term *colonia*.

There was a brief flowering in Britain at the end of the 18<sup>th</sup> century of new settlements exploiting water power. Cromford, in Derbyshire, England, was the first factory of the industrial revolution 1771, but it was an adjunct to an existing settlement in a valley that was already fairly crowded. So was Belper, and the only completely new settlement, albeit now a suburb of Derby, was Darley Abbey. These are among a small number of British textile colonies that have universal significance as models for other places: the Derbyshire mills where the factory system was worked out, and the Scottish mill villages where new forms of settlement were developed for the labour force. It was in Scotland that there was both the space and the volumes of water that made the creation of entirely new settlements feasible. The culmination of the mill village as a model for social improvement was the founding of New Lanark in Scotland and 70 years later, Saltaire in Yorkshire. Accordingly the Mills of the Derwent Valley in Derbyshire, New Lanark and Saltaire were inscribed as World Heritage Sites by UNESCO in 2001.<sup>2</sup>

If the case made for world heritage inscription of the three UK sites was only that they were influential within the UK, that case would be flimsy. A historical study of planned villages in Scotland was critical of the social provision made by new entrepreneurs. TC Smout<sup>3</sup> concedes that some Highland settlements did grow into the main towns in the locality, and that some lowland villages played a part in bringing industrialisation, but that seems to be all: a short-lived phase of high aspirations and dashed hopes.

From a purely British perspective, the factory village does indeed seem to have been

a *cul de sac*. Next century British industrial colonies were to recur only in exceptional places for philanthropic (Saltire, 1853, Port Sunlight 1883) or practical reasons (railway towns like Swindon or Crewe, many mining villages, and the Kinlochleven aluminium smelter, 1907). The only new 19<sup>th</sup> century settlement in Scotland was Walkerburn in Peebleshire in 1854.<sup>4</sup>

Yet abroad, in North and South America (Mexico and Brazil offer strong examples in the south that I will not attempt to cover here), Spain and Russia, industrial colonies were established at a phenomenal rate. Whether they were directly influenced by Scottish 18<sup>th</sup> century villages, or whether they look similar because of the similar circumstances in which they were placed, is a moot point. An international perspective puts these Scottish factory towns into context.

### Scottish cotton mill colonies

In 1784 Richard Arkwright came “to find a razor in Scotland to shave Manchester” and was briefly a founding partner at New Lanark, Woodside and Stanley Mills. Part of his motive was social advancement with the help of George Dempster MP<sup>5</sup>, and established merchants like David Dale.<sup>6</sup>

**New Lanark** was created from a “morass” downstream from the smallest of the falls of Clyde.<sup>7</sup> Once the mills had taken the relatively flat ground, what was left was a hillside that militated against the generous spacing, low-rise and formal layout required in a recognised planned settlement. The earliest-known views, 1799, show all four spinning mills: Mill One axial to the lade (Scottish word for mill leat or power canal), the other three parallel to it between lade and river. On the uphill side from the lade is the housing:

initially simple cottages in two terraces. These gave way to the Nursery and New Buildings soon after Owen arrived. All of the other housing that exists today was erected in the early 1790s. The streets are terraced and the housing is stacked vertically, as tenements. The topography meant a layout that did not conform to the rational ideal as seen by contemporaries. Not least among these was Robert Owen, who managed the village from 1800, built a School and a “New Institution for the Formation of Character.” But he left New Lanark in 1827 hoping to create a much more regularly-laid out new community of his own.

New Lanark was restored from the 1960s–70s: first the housing, then, after the mill closed, became a scrapyard and was at last compulsorily purchased, the mills and social institutions. The place continues to be an inspiration to many. A digital scan of the site has been created by Historic Scotland and Glasgow School of Art, as part of the Scottish Ten digitisation project, and may be viewed on Youtube (the axial view along the power canal towards Mill 1, with Mills 2–4 on the left, that forms part of the argument presented here about parallels with Lowell, occurs at 50–58 seconds into the clip): <http://www.youtube.com/historicscotlandtv#p/a/u/1/VJxLjqDJCM8>

**Blantyre**, Lanarkshire, was founded by David Dale in 1787. The five-storey mills, one axial to the lade, one parallel to it, are mostly demolished. The mills are similar to New Lanark, but the housing less so: a formal square was laid out to an improved plan, separate from, and at a higher level than, the mills. A terrace of two- and three-storey tenements is preserved as the birthplace of African explorer David Livingstone. That single-

roomed house now has special importance as an intact millworkers’ house. Ownership recently passed to the National Trust for Scotland.

**Stanley Mills**, near Perth, were founded in 1786–87 and in the 20<sup>th</sup> century was owned by the conglomerate Jute Industries Ltd, Britain’s most northerly cotton mill.<sup>8</sup> The mills formed a square, two sides being 18<sup>th</sup> century mills with parallel power canals. One crossed through East Mill to drive pairs of waterwheels. Excavation by Historic Scotland of the largest of the wheelpits revealed a complex arrangement of four waterwheels from which power was transmitted to two mills. This re-equipment took place in 1823–25. A gasworks was also uncovered, necessary to provide lighting in the country mills which worked as and when water was available. Steam power was never needed, but a new hydro-electric power station supplanted earlier turbines in 1921–23, and has restarted the generation of renewable electricity.

The village developed fitfully as a 1- and 2-storey grid on a plateau above the mills. The houses have been remodelled to increase their size from single- or two-roomed flatted houses, as there was considerably depopulation during the cotton famine, 1862–65 when the owner speculated in his stock of cotton and closed the mill for a while.

Stanley Mills finally closed in 1989, and in 1995 came into the care of Historic Scotland, and of those who bought flats in two of the biggest mills, converted to housing by the Prince’s Regeneration Trust.<sup>9</sup>

**Deanston Mill**, near Doune, was founded in 1785, and the original mill (for mules as well as water frames) was demolished in 1947. Extant mill buildings, now part of a whisky distillery, date from 1830 – a dome-



*Stanley Mills, Scotland, showing the original Bell Mill, of 1786–7, Arkwright pattern on the right and Mid Mill, three phases from 1823–1840, on the left. Three stone arches carried water to the wheels, and the fourth led to an earlier corn mill and spillway.*  
© Mark Watson 2010.



*Stanley Mills, showing the wheelpits, with curved stonework that guided water onto two breastshot waterwheels, built in 1823–5, filled in since 1922 and excavated by Historic Scotland in 1995–8. There were two further wheels in tandem beyond these. The power take up went separately into Bell and Mid Mills. The concrete casing for a water turbine stands in the left hand wheel pit, put in after the eccentric working of the wheels had distorted the stone surrounds.*  
© Mark Watson 2010.

vaulted weaving shed – and 1949.

The earliest single-storey housing was succeeded by more substantial houses lining the lade. A conservation area protects surviving 2-storey tenement housing erected in 1811 and 1820, which housed 1200 people in around 1840. As at Stanley, it is evident from the blocked doorways that the houses have been skilfully enlarged in size and reduced in number within each terrace.

**Catrine**, Ayrshire, was founded and co-owned from 1787–1801 by Dale and Claude Alexander. The mule and twist mills were demolished in 1946 and 1968, and the most significant remaining element is the water system, the Catrine Voes. The water was brought from a high level to the mill via an aqueduct, stopping just short of the church which, while overlooking the rest of the village, does not itself have prime position. Instead pride of place went to the Twist Mill, the centrepiece of Mill Square until it burned down in 1968. Perhaps the inspiration for this aspect of town planning lay in St Andrews Square, Glasgow. There, St Andrews Church was completed in 1759 and the buildings surrounding it in 1786–87. Living in nearby Charlotte Street, Dale may have been inspired to repeat that layout at Catrine.<sup>10</sup>

The housing has the superficial appearance of two-storeyed terraced houses, but is mostly flats. A row by the Voes was heightened by a second storey in brick, not to make houses more spacious but to cheaply increase their number. A conservation area extends from the village to include the Voes and a project is under way to revive water-power here.

**Woodside Mill**, Aberdeen: Two large mills were each axial to the power canal, which split to power two wheels in each. The first of these was started in 1778, extended in 1786 after

Arkwright's visit (he was a partner in Gordon Barron and Co and provided training for employees). The second was built in 1793, with two towers of Venetian windows, as at Catrine. The water system was re-arranged in 1830 by Hewes and Wren, who supplied a very large suspension wheel, displayed until recently in the Royal Museum of Scotland in Edinburgh. Water from the river Don circulated around printfields before arriving at the spinning mills.

Two regular rows of terraced houses occupied higher ground. Residents were woken at 5.30 each morning by the blast of a horn. In 1797 a barracks was erected for children: 'bun' (or bound) boys apprenticed to the calico printworks. Whereas in the early days drunken behaviour was common among the printers, the moral condition of the village was improved by two churches and Sabbath schools bringing a "healthy moral restraint to the village that is wanting in larger towns".<sup>11</sup>

Although built for flax rather than cotton spinning, the nearby Grandholm Mill of Leys, Masson and Co., tell us quite a lot about the water systems employed. The big mill of 1794, shorn of two storeys after a fire in 1905, was recently converted to flats. Grandholm and Woodside mills were a little way from Old Aberdeen, but not so far that the workers could not choose to live elsewhere, so the separate identity of these little settlements could not avoid influence by Aberdeen.

### American cotton mill communities

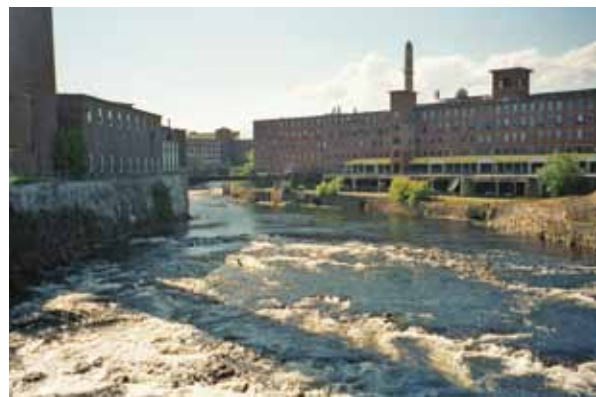
James Montgomery was a Scots mill manager, born in Blantyre in 1794 and recruited from managing a Glasgow mill to one in America in 1836. His *Practical detail of the Cotton Manufacture of the United States of America*, and the state of the cotton manufacture of

that country contrasted and compared with that of Great Britain (1840) remains the essential text for the history of the American industry. It also offers insights into the Scottish mills he left behind.<sup>12</sup>

**Saco**, Maine, was his first stop as manager for the York Manufacturing Co. All four of the mills he knew survive, built in 1833–1840, later linked together, given an extra storey and flat roofs. Mill 1 had originally 6 storeys and pitched roofs, but came down in size when rebuilt in 1833. These, and Pepperell-Biddeford Mills opposite, form an impressive industrial canyon as the river drops 34 feet over falls. The way in which mill buildings come to the water's edge is rather like Tammerkoski in Tampere.

Montgomery's book<sup>13</sup> took as typical of best Scottish practice an urban steam-powered mill, which he contrasted with American mills, nearly all of which were water-powered. In describing many of the features of American mills he could in fact have been describing his birthplace, Blantyre: mills of

*Left, Pepperell Mill and right, York Mfg Co, Saco, Maine, USA. The mills have been connected together and given a flat roof that complies with insurance requirements. © Mark Watson 2004.*



4 to 5 storeys and a semi-basement, with an architectural feature made of the central stair tower, as at Catrine and New Lanark. The first of the Mills, always “Number One” and invariably distinguished from the others by its bellcote cupola, would stand at the end of a power canal. Between one and six other mills, numbered sequentially, would stand in line parallel to this, closely spaced but initially detached from each other and from lower, parallel, picking houses. The principal difference externally was the double monitor roof, giving way in the 1840s to conventionally pitched roofs similar to the British model, and later still shallower pitches. Construction systems diverged with the use in a minority of British mills of iron frames from 1797 and

*Waltham Mill, The prototype set up by the Boston Associates at Waltham, between Boston and Lowell. The original fabric of the first Waltham Mill (1813) may still be made out on the left, with a second mill of 1816 added on the right, linked together in 1843. Like many of the early mills, it lost its original double clerestorey/mansard profiled roof in 1891 in the drive for more accommodation, and lower insurance premiums. © Mark Watson 2004*



in America from 1826 of the “slow burning” timber floor.

The tall brick or masonry-clad American mills are often described as utilising the “Waltham System”, after the place of its first use in 1814, and to distinguish them from the small first-generation timber-clad mills.<sup>14</sup> The Waltham-Lowell system added power loom weaving to spinning under one roof. They were most often sited on rivers in New England that dropped over waterfalls from plateau to plateau.<sup>15</sup> Schools and libraries feature relatively early in the provision offered at these company towns. Each one may owe something of its domestic, social and moral welfare provision, in the barracks and boarding houses, as well as in the management of water to spin cotton, to Scotland.

**Lowell**, Massachusetts, set a reputation for virtuous mill girls and for good town planning, and now is a byword for a city that has regenerated by celebrating its industrial past. It was planned as a city that would repeat the functional layout first tried by the “Boston Associates” at Waltham, and yet it resembles in some respects Scottish mill villages. Ten companies repeated between 1824 and 1848 the New Lanark pattern in which the first mill was at right angles to the lade or power canal, and other mills (named 2–4) stood in a row between it and the river.<sup>16</sup>

The most obvious visual parallel between American and Scottish mill layout is that between Catrine’s Mill Street and Lowell’s Dutton Street. Catrine’s Twist Mill stood axial to the tailrace, lined with trees. The Catrine lade was itself vaulted over after a drowning accident in 1903. Merrimack Manufacturing Company in Lowell similarly had a mill with a bellcote square-on to the lade, along which was laid out a tree-lined promenade where

mill girls could take the air.<sup>17</sup>

The similarities between the layouts of mills in New England and those in Scotland, laid out 40 years previously, suggest not only a functional response to the harnessing of a waterfall but also familiarity with the pioneer at New Lanark. Nathan Appleton, the Waltham partner who helped found the town of Lowell in 1821, met Francis Cabot Lowell in Edinburgh in 1810, and on his tour of Scotland made careful notes on the experimental factory at New Lanark, describing its production, use of water-power, and apparent prosperity<sup>18</sup>. The link between the new improved mills and communities of New England and New Lanark may be a consequence of Americans directly copying from Scots as well as their avowed wish not to repeat the English experience. Lowell had a social purpose.

Some variation developed. From 1828 belts began to take the place of the vertical shafting typical of British mills. There followed outward-flow Francis turbines, devised by the engineer of the Lowell locks company, James B. Francis. The first survives at Pawtucket Gatehouse (1848), and there are others in the basements of mills.

The Lowell mills employed large numbers of young women who were well-paid and closely controlled. Boarding houses for farmers' daughters recruited from around about feature in the promotion of Lowell as a healthy and respectable hive of industry. Two- and three-storey brick terraces and boarding houses stood at right angles to their mills. Now that Lowell – declared America's first urban National Park in 1978 – is recovering its identity as America's first city of the industrial revolution, it became necessary to reconstruct a row of 1837 boarding houses in

order to fill a gap in the telling of the story. Lowell shows how the built environment can be capitalised upon for regeneration through an understanding of the urban landscape.

The National Park Service manages, interprets and gives tours of the canal system, displays a restored boarding house, a turbine in Suffolk Mills and a noisy weave room in Boott Mills (1836). The American Textile History Museum in the Kitson machine shop (1866) covers the national industry.

**Manchester**, New Hampshire. Amoskeag Mills developed from 1838 onwards, and with mergers peaked at 17,000 employees in 1912. They then formed the largest complex of contiguously-owned mills in the world, having 23,000 looms. 60% of the buildings survive, including most of the larger ones, in business or university use.<sup>19</sup> The city acknowledges a debt in its name to Manchester, Lancashire, but its layout – mills aligned parallel to the power canals taken from Amoskeag Falls, the tailraces exiting into a lower power canal or back to the river – owes rather more to New Lanark.

The large dam now serves a 1924 power station, and the canals (first dug 1793–1807) have been partly filled in. Amoskeag Number 11 Mill and Coolidge Mill of 1909 dominate the opposite bank of this wide river, and had relied on steam power but the rest – Amoskeag, Manchester Locomotive Works (from 1854) and the part fireproof Manchester Print Works, 1853 – used water.

Company housing is especially well preserved, in both 2-storey and 4-storey forms, the latter with tiers of timber verandahs at their rear. Most were built between 1838 and 1857 and were an interlocked combination of boarding houses on the Lowell model and tenements for families.<sup>20</sup> The main non-

native born residents were initially Irish, then large French Canadian families arriving after the Civil War led to the conversion of boarding houses to tenements. 67 surviving blocks of mill housing in an area of 32 acres form a National Historic District designated in 1982. The design standard is uniform and the layout is owed to a predetermined plan.

**Lawrence**, Massachusetts, USA, is a cotton city planned from 1845 on the Lowell model along two power canals. The mills first built for cotton spinning along a broad power canal include Duck Mill, Pemberton Mill (the first mill of which collapsed in 1854: blamed on poor iron castings which brought to an end that form of construction in USA); Atlantic, Pacific and Bay State Mills. Surviving buildings are in brick and reinforced concrete. Some boarding houses exist, on the opposite banks of the power canal, as also do terraced houses for Essex Company mechanics for Lawrence Machine Shop, 1847.

Steam-powered wool mills followed: Wood Mill, (1906) and Ayer Mill (1909), both for the American Woollen Co.; and Everett Wool c1890. This was because the water-powered cotton industry was by then losing ground to steam-powered mills with access to cheap coal in New Bedford and Fall River, and to mills in the southern cotton-growing states.

The landscape of the power canal is well preserved here and also at Lewiston, Maine (two power canals) and Troy in New York State which has as many as five power canals.<sup>21</sup>

**Paterson**, New Jersey, also had a large number of mills, the earliest planned from 1791, and started spinning in 1794. But according to Montgomery “there is a total want of system in the style and arrangement of the mills and machinery. The whole town has an air of slovenliness, a want of taste and pub-



*Pemberton and Pacific Mills, Lawrence USA, by the power canal. © Mark Watson 2004.*

lic spirit, an entire absence of the enterprising spirit of the New England manufacturers” so in that sense it was more like a British mill town than the American ideal model.<sup>22</sup> The use of water power was not then in itself enough to result in ideal city planning.

There is a host of smaller single-company mill towns in which the basic Lowell style is evident and where both housing and mills survive. The smaller towns differ in that they were created by family-owned enterprises, for example Sawyer Mills, Salmon Falls and Harrisville in New Hampshire. Yet some of the mills are on a larger scale than at Lowell, notably Newmarket and Cocheco Mills in Dover, NH. Houses are mostly timber-framed and clad, and originally at least accommodated several families. The model for the timber housing appears to be Scandinavian, but some of the boarding houses are brick as in the Lowell model, there and at Dover, and bear some resemblance 18<sup>th</sup> century housing

| Milltowns in NE United States of America | Year of incorporation; then dates of mills   |
|--|--|
| Waltham, Mass, cotton                    | 1815   |
| Lowell, Mass, cotton                     | 1822, 1825, 1828, 1830, 1835, 1839<br>(32 mills built by ten corporations before 1845)                                     |
| Nashua, NH, cotton                       | 1823 (Nashua, Jackson and Harbor Corporations)   |
| Manchester, NH cotton                    | 1831 (Amoskeag Mills, Manchester Print Works)  |
| Lawrence, Mass, cotton then wool         | 1845 (Bay State, Pacific, Atlantic, Pemberton Mills)   |
| Saco-Biddeford, Maine, cotton            | 1825 (York Manufacturing Co) Mill 1 1826, rebuilt 1833 after fire, Mill 2 1835, Mill 3 1837, Mill 4 1840                   |
| Harmony Cahoes, NY, cotton               | 1836   |
| Dover NH for cotton, later wool.         | 1827 2000 employees at Cocheco Pacific Mills   |
| Salmon Falls, NH, wool then cotton       | Mill 1 1822, wool, fire 1834, rebuilt 1843 cotton<br>Mill 2 1848, 600 hands in 1900  |
| Newmarket, NH, cotton                    | 1822, Mill 1 1823, Mill 2 1825, Mill 3 1827–29<br>(early slow-burning construction),<br>Mill 4 1869, 700 employees in 1900 |
| Great Falls NH, cotton                   | 1823   |
| Sawyer Mills, NH, wool                   | 1824 wool, 600 employees by 1892   |
| Harrisville, NH, Wool                    | Upper Mill 1832, Granite Mill 1846, Cheshire Brick Mill 1860   |

in Verviers, Belgium. The mills are mostly adapted to other uses, benefiting from tax incentives to do so, and have impressive bell-cotes, warehouses at riverside locations.

Southern New England – Rhode Island and Connecticut – contains still more mill villages that are model in terms of their planning and paternalist in their identification with the mill and its owner. Several are in the Pawtuxet Valley, such as Royal<sup>23</sup>, Arctic, Coventry, Lippitt and Hope Mills. A few are still in a specialist textile use. Others are adapted to other uses with the help of tax concessions. The Blackstone River Valley is a National Heritage Area<sup>24</sup> that promotes an understanding of that heritage. They are rather small as they relate in most cases to single mills, and of-

ten are now parts of conurbations where it is hard to see one mill colony stop and the next begin, so they are not included in the above table. The same could be said of smaller mills set at water-powered sites in hilly parts of Europe: Switzerland, Northern Italy, Greece and Spain (e.g. the Parc Fluvial Navàs-Berga). But there is a different order of magnitude, closer to the mills of northern New England, at two sites in what was formerly Russia.<sup>25</sup>

### **Narva, Estonia, and Ivangorod, Russia**

On the border between Estonia and Russia a large waterfall divides Narva from Ivangorod. There, Kreenholm cotton and Steiglitz flax mills face each other across a frontier, just

as do two forts from the time when Sweden and Russia met at this point. Here was a flax spinning mill at Ivangorod in the 1820s. In 1845–49 Baron Steiglitz added a "perfectly fireproof" flax mill, designed by the Scot Sir William Fairbairn (using identical iron capitals to those at his mill at Saltaire, UK).<sup>25</sup>

Ludwig Knoop founded the Kreenholm cotton mills on an island in 1858. These, expanding on the Estonian side along a power canal, became the biggest mill complex in Europe, having 458,350 spindles by 1901. Large barracks in brick and smaller timber-built houses, were provided for the workforce. The Russian translation is given as Kreenholm, but the Estonian and Swedish version is Kreenholm.

Despite their location on the frontline in 1944, and showing some evidence of the traumas of that time, most of the mills survive to this day across the now dry waterfall. On the Kreenholm side, the main casualty was Georg Mill. It had been an extraordinarily modern construction for its date, 1899, with large windows between two brick stair towers. The area between the towers was reconstructed in reinforced concrete after what is presumably war damage. It contains rooms full of Jacquard looms weaving patterned cloth.

Kreenholm Mills are the largest operating cotton mills in Europe. Besides Georg Mill there is Iola, a long spinning mill (Fig 5: the buildings were named after sons and daughters of Ludwig Knoop), the two original quadrangular mills on the Kreenholm island, now also used for weaving, and dyeing and finishing departments with tall water towers.

Kreenholm also has a settlement of workers' barracks and tenements, both brick and timber-built, baths, schools and a hospital, adjacent to the mills.



*Cotton spinning in Iola Mill, Kreenholm Mills, Narva, Estonia, © Mark Watson 2001.*

## Tampere, Finland

Now the third largest city in Finland, Tampere was sited by rapids at the drop in levels between two lakes. Here it was that Finland's first factory was started, by the Scot James Finlayson in 1820. The Finlayson Mill complex also saw Finland's first iron columns (1837) first gas lighting (1842), first electric light (1882) and first sprinkler system (1892). Scandinavia's largest steam engine is still in situ here. Finlayson's machine shop and cotton mill were the foundation for other industries: linen, wool, paper and cardboard. In the 1860s, at least 20 different production plants relied on the Tammerkoski, including a broadcloth factory (Tampereen verkatehdas), 1856, a roofing felt factory, 1866 (the start of Nokia), and Liljeroos wool mill added in the 1890s. The Tako paperboard factory is still working in the heart of the city. The landscape is well preserved thanks to adaptive re-use and is interpreted at the Museum of Labour, Werstas<sup>27</sup> in the Finlayson cotton

mills, the Vapriikki museum in the Tampella engineering and linen works on the other side of the river, and workers housing which has its own museum, Amuri.<sup>28</sup>

While Tampere represents a type of city found elsewhere in the world, its factories around the rapids are extremely well presented and adapted to new purposes that ensure they continue to be relevant today. ■

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Historic Harrisville

#### Estonia:

Lev Migdalskij, Krenholm Holding Ltd

Jaan Valli and Helle Sosnask, National

Heritage Board

Epi Tovhri, Tartu

#### Russia:

Ekaterina Glaukhova, Centre for

Architectural Preservation, St Petersburg

Dundee Archive And Record Centre

George Munro (born in St Petersburg)

#### Finland:

Tuija-Liisa Soininen,

Kulttuuriympäristöyksikkö

Helina Koskinen, NBA

Tarja Perkiömäki

Hanna Yli-Hinkkala, Werstas

<sup>1</sup> For other examples, see Mark Watson, "Typology for Textile Sites: widening the worldwide list" in *Patrimoine de l'Industrie 11* (2004) pp. 47–60

<sup>2</sup> Some of the themes of this article are discussed by the author in *Historic Scotland, Nomination of New Lanark for Inclusion in the World Heritage List* (2000). This was pursued after inscription of that site in the series of industry-by-industry lists prepared by TICCIH for use by ICOMOS in guiding the World Heritage Committee as to sites that have some international significance. These follow the Global Strategy for types of monuments that are at present under-represented on the World Heritage List. See [http://www.international.icomos.org/world\\_heritage/whlgaps.htm](http://www.international.icomos.org/world_heritage/whlgaps.htm) and the The Textile Special Interest Section of TICCIH discussed criteria for evaluating the significance of textile sites in London (2000), Barcelona (2001), Euskirchen and Ratingen (2003) and Sedan (2007). The list is out for consultation on the TICCIH website at <http://www.mnactec.cat/ticcih/sections.php>

<sup>3</sup> TC Smout "The Landowner and the Planned village in Scotland, 1730–1830" in *Scotland in the Age of Improvement*, NT Phillipson and R Mitchison, editors (1970) p. 97. He counts 126 villages: "superficially the planned village movement must appear as an enormous and inevitable failure... in the lowlands the planned village was killed by the railway and by the concentration of industrial activity in the towns... as soon as the textile industries had mastered the art of utilising the steam engine production moved into factories, and the factories moved into towns near the fuel supplies: this killed many even of the factory villages, especially the outlying ones."

<sup>4</sup> FW Pearce, *Walkerburn its Origins and Progress 1854–1987* (N.D.)

- <sup>5</sup> AJ Cooke, Richard Arkwright and the Scottish Cotton Industry, *Textile History* Vol 10 (1979)
- <sup>6</sup> David J McLaren, David Dale of New Lanark (1999)
- <sup>7</sup> Ian Donnachie and George Hewitt, *Historic New Lanark* (1993)
- <sup>8</sup> Anthony Cooke Stanley: from Arkwright Village to Commuter Suburb 1784–2003 (2003) and see [http://www.historic-scotland.gov.uk/index/places/propertyresults/propertyabout.htm?PropID=PL\\_273&PropName=Stanley%20Mills](http://www.historic-scotland.gov.uk/index/places/propertyresults/propertyabout.htm?PropID=PL_273&PropName=Stanley%20Mills)
- <sup>9</sup> <http://europanostra.org/videos/> for Europa Nostra Award 2009
- <sup>10</sup> JR Hume, in his account at the “Legacy of Dale” seminar in Glasgow Caledonian University in 2007 of the importance to Dale of his religious principles, mentioned that he was prominent in Merchant’s Hall, whose church this was, so the link is yet stronger.
- <sup>11</sup> P Morgan *Annals of Woodside and Newhills* (1886)
- <sup>12</sup> David J Jeremy *Technology and Power in the Early American Cotton Industry* (1990)
- <sup>13</sup> James Montgomery, A Practical detail of the Cotton Manufacture of the United States of America, and the state of the cotton manufacture of that country contrasted and compared with that of Great Britain (1840). Reprinted in David J Jeremy, *Technology and Power in the Early American cotton industry* (1990)
- <sup>14</sup> <http://www.flickr.com/photos/36713050@N03/3401739393/> and <http://www.flickr.com/photos/marc72/3093461019/>
- <sup>15</sup> Richard M Candee “Early New England Mill Towns of the Piscataqua River Valley” in J.S Garner ed., *The Company Town* (1992). Sites were inspected by Mark Watson and Fred Connor in 2004.
- <sup>16</sup> [http://www.nps.gov/lowe/2002/loweweb/lowe\\_history/lowe\\_handbook/prologue.htm](http://www.nps.gov/lowe/2002/loweweb/lowe_history/lowe_handbook/prologue.htm)  
The guidebooks for FICCIH in 1984 and for SIA in 2004 are very useful resources.
- <sup>17</sup> Patrick Malone and Charles Parrott, “Greenways in the Industrial City: Parks and Promenades along the Lowell Canals in IA: the Journal for the Society for Industrial Archaeology Vol 24, Number 1, 1998 pages 19–40
- <sup>18</sup> Information from Patrick Malone, Brown University, USA, the source of a useful discussion. now published as Patrick Malone, *Waterpower in Lowell: Engineering and Industry in 19th century America* (2010)
- <sup>19</sup> For the Millyard Museum, which displays amongst other items letters of recommendations for weavers from Glasgow factories, see [www.manchesterhistoric.org](http://www.manchesterhistoric.org)
- <sup>20</sup> National Register of Historic Place nomination form 1982.
- <sup>21</sup> Information on Troy and Lawrence from Duncan Hay, National Park Service.
- <sup>22</sup> Montgomery (1840). Jeremy, op.cit., notes that the second sentence was cut from the second edition.
- <sup>23</sup> <http://www.artinruins.com/arch/redevelop/royalmill/#>
- <sup>24</sup> <http://www.nps.gov/blac/discover/history.htm>
- <sup>25</sup> Fairbairn, William, *Mills and Millwork* (1864) p192–205
- <sup>26</sup> The first Kreenholm mills are illustrated in Watson, op cit *Patrimoine de l’industrie* 11 (2004) and at <http://www.flickr.com/photos/36713050@N03/sets/72157625388834955/>
- <sup>27</sup> [www.tkm.fi](http://www.tkm.fi)
- <sup>28</sup> [www.history.tampere.fi](http://www.history.tampere.fi) ; <http://www.tampere.fi/english/vapriikki.html> and <http://www.tampere.fi/amuri/museumquarter.htm>

### **The following web galleries offer further illustrations:**

“mill cities at water falls with power canals” (Narva, Tampere, Port Law)

<http://www.flickr.com/photos/36713050@N03/sets/72157625388834955/>

“cotton mill cities with power canals”

(New England, USA)

<http://www.flickr.com/photos/36713050@N03/galleries/72157625513912368/>